United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Ohio Department of Natural Resources, Division of Soil and Water Conservation; Ohio Agricultural Research and Development Center; and Ohio State University Extension

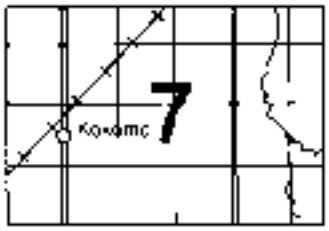
Soil Survey of Harrison County, Ohio

How to Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

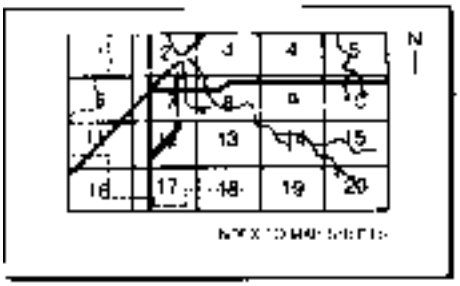
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.



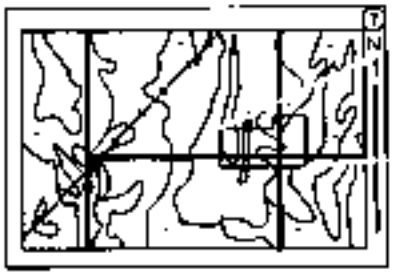
MAP SHEET

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

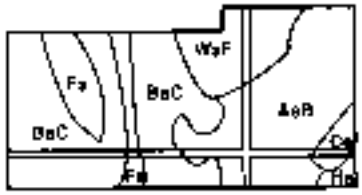


To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.



MAP SHEET

Locate your area of interest on the map sheet. Note the map units symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters or they may be a combination of numbers and letters.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1990. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This survey was made cooperatively by the Natural Resources Conservation Service; the Ohio Department of Natural Resources, Division of Soil and Water Conservation; the Ohio Agricultural Research and Development Center; and the Ohio State University Extension. The survey is part of the technical assistance furnished to the Harrison Soil and Water Conservation District. Financial assistance was provided by the Harrison County Commissioners.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: An area of Westmoreland-Dekalb complex, 40 to 70 percent slopes, used as woodland.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 1998

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Patrick K. Wolf
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Harrison County, Ohio

By Linn E. Roth and Richard W. Buzard, Ohio Department of Natural Resources, Division of Soil and Water Conservation

Fieldwork by Linn E. Roth, Richard W. Buzard, and James W. Kerr, Ohio Department of Natural Resources, Division of Soil and Water Conservation

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Ohio Department of Natural Resources, Division of Soil and Water Conservation; the Ohio Agricultural Research and Development Center; and the Ohio State University Extension

General Nature of the County

HARRISON COUNTY is in the eastern part of Ohio (fig. 1). It has a total area of 262,800 acres, or about 410 square miles. In 1990, the population of the county was 16,085 (U.S. Department of Commerce 1991). Cadiz, which is in the east-central part of the county, is the county seat.

Farming and coal mining are the major enterprises in the county; however, woodland is one of the dominant land uses. Other land uses include residential and recreational development. Surface mining has affected much of the landscape in the northeastern and southeastern parts of the county. Dairy farming and raising beef and sheep are the major farming enterprises.

Climate

Harrison County has a continental climate characterized by wide ranges in annual and daily temperatures. Winters are cold and snowy. Summers are warm and humid and are occasionally marked by very hot days. Rainfall is well distributed throughout the year. Fall is the driest season. Normal annual precipitation is adequate for all of the crops commonly grown in the county, but periods of moisture stress occur in some years. The growing season in the valleys differs slightly from that on the ridgetops. The latest freeze in spring and the earliest freeze in fall generally occur in valleys because cool air flows down the slopes into the valleys on nights when the sky is clear and the wind is light.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Cadiz, Ohio, in the period 1951 to 1987. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 30 degrees F and the average daily minimum temperature is 21 degrees. The lowest temperature on record, which occurred on January 21, 1985, is -21 degrees. In summer, the average temperature is 71 degrees and the average daily maximum temperature is 82 degrees. The highest recorded temperature, which occurred on September 2, 1953, is 100 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 38 inches. Of this, 22 inches, or 60 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of

Figure 1.—Location of Harrison County in Ohio.

record was 3.28 inches on July 22, 1980. Thunderstorms occur on about 40 days each year.

The average seasonal snowfall is about 34 inches. The greatest snow depth at any one time during the period of record was 12 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 30 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 12 miles per hour, in spring.

Tornadoes and severe thunderstorms occur occasionally. These storms generally are local in extent and of short duration. They cause damage in a variable pattern.

History

Matilda Heavilin, board member, Harrison Soil and Water Conservation District, prepared this section.

The first settlers arrived in the survey area in 1785 when Congress passed the Northwest Ordinance. Nearly 75 percent of the settlers were Scotch Irish. Other settlers at that time came from Germany or England or were Quakers.

Harrison County was officially organized on February 1, 1813. It was named after General William Henry Harrison. Cadiz was founded in 1804. It was located in an area where the Moravian Trail, which ran from the Ohio River to the Tuscarawas Valley, crossed the westward trail from Pittsburgh. Homesteaders settled in the area because of the heavily timbered land and the availability of pasture for sheep. By 1880, Harrison County led all of the counties in Ohio and was third in the Nation in the number of sheep raised and the production of wool.

Extensive changes occurred in the county when railroad construction began in the early 1850's. Villages along the railroad prospered, while villages that were not along the iron rails declined in size. Farmers profited by wider marketing opportunities, and the demand for coal by rapidly expanding industries promoted mining. Perhaps attracted by employment availability, a number of Polish, Italian, Hungarian, and Slavic-speaking immigrants arrived in the early 1900's.

In 1906-7, underground mining machinery, followed soon by conveyors, significantly increased man-hour production. The first steam shovel in 1919 also contributed toward establishing coal mining as the county's leading industry. In the 1880's and 90's, profitable amounts of gas and oil were discovered and produced for a number of years.

After the disastrous flood of 1913 influenced passage of the 1933 Conservancy Act, Clendening, Piedmont, and Tappan Lakes were constructed. Camping and water sports provided prime recreation.

Physiography, Relief, and Drainage

Harrison County is in the unglaciated Allegheny Plateau Region. The area has been extensively dissected by drainageways that eventually empty into the Ohio River to the east and into the Tuscarawas River to the west. Most areas in the county are thoroughly dissected by drainageways that have cut deep valleys and left narrow ridgetops. The highest point in the county, about 1,366 feet above sea level, is in German Township. The lowest point, about 861 feet above sea level, is in Washington Township.

The Flushing escarpment, situated in the eastern fourth of the county, separates the streams flowing east to the upper Ohio River from those flowing west to the Tuscarawas River. Cadiz is located on the Flushing escarpment. The major streams flowing east are Cross Creek and Short Creek. The major streams flowing west are Conotton Creek, Little Stillwater Creek, and Stillwater Creek. The valleys of Cross Creek and Short Creek are narrow, while the valleys of Conotton Creek, Little Stillwater Creek, and Stillwater Creek are broad.

Geology

The bedrock in the county consists of Pennsylvanian and Permian age sedimentary rocks. These rocks were elevated with respect to sea level and later eroded. The strata have a general southeastwardly dip, which is interrupted periodically by a few gentle anticlinal and synclinal folds. The Cadiz anticline, which is in the eastern part of the county, is well pronounced. Its crest passes through the town of Cadiz in a northeast to southwest direction (Condit 1912).

Of the rocks belonging to the Pennsylvanian System, part of the Allegheny Formation and all of the Conemaugh and Monongahela Formations are represented in surface outcrops. As a result of the regional slope of the strata in a southeasterly direction and of prolonged stream erosion, which has dissected the land surface, exposures of the Allegheny Formation are confined to the lower slopes of the deep valleys along the western border of the county. The Conemaugh Formation outcrops in about two-thirds of the county. Most of the remaining outcroppings are from the Monongahela Formation, which forms a cap over the Conemaugh Formation in the southeastern part of the county (Lamborn 1951).

The lower 40 feet of the Washington Series, which is in the Permian System, is represented in surface outcrops. These outcrops are on the ridgetops in southern Athens and Short Creek Townships.

The various strata exposed in the county generally consist of numerous beds of sandstone, shale, limestone, and coal.

Alluvial deposits are in the valleys of Conotton Creek, Little Stillwater Creek, and Stillwater Creek. The deposits are from watersheds to the east and southeast. They are chiefly silt and clay. Smaller alluvial deposits are in the valleys of Cross Creek and Short Creek.

Farming and Other Land Uses

About 89 percent of the acreage in the county is farmland (USDA 1985). Most of the cleared areas of farmland are used as cropland or pasture. The remaining acreage of farmland is in woodlots or is idle land that has been affected by surface mining and has never been reclaimed. About two-thirds of the cropland is in hay, which is commonly grown in contour strips with corn, oats, or wheat.

Almost one-half of the local farm income is from the sale of dairy products, and about one-fourth is from the sale of beef or sheep (Ramey and Matthews 1988). Hogs and poultry are also marketed. The sale of crops, mainly corn and hay, accounts for about one-fifth of the local farm income.

Most of the farms are managed by the owner, who typically resides on the farm. About two-thirds of the farmers work at least part time off the farm. In recent years the number of farmers has remained about the same and the average size of active farms has increased slightly.

About 1.5 percent of the total acreage in the county is within city or village limits. Residential areas outside of cities and villages comprise 9 percent of the acreage (USDA 1985).

Recreation is an important land use in the county. The Muskingum Watershed Conservancy District owns and administers land and water around Tappan Lake, Piedmont Lake, and Clendening Lake for flood control and recreational activities, including camping, fishing, hunting, hiking, and swimming. Harrison State Forest provides opportunities for hunting, hiking, and camping.

Natural Resources

The most important natural resources in the county are soil, minerals, water, oil, and natural gas.

Coal mining is a very important part of the local economy. Deep mining began in the mid-1800's, and surface mining began after World War I and expanded during World War II. The major coal beds are the Upper Freeport (No. 7), Pittsburg (No. 8), and Meigs Creek (No. 9). Surface mining is the most active form of mining in the county.

Water Supply

Most of the water for household and industrial uses is obtained from wells drilled into bedrock formations. Some of the wells have been affected by nearby surface mining. Brine generally is deeper than 200 feet below the valley floor (Stout, Van Steeg, and Lamb 1943). Most of the farms have one or more good springs suitable for watering livestock. Surface water is available from streams and ponds, but some of the streams have been contaminated by acid mine drainage.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists

observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landform or with a segment of the landform. By observing the soils in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

Survey Procedures

The general procedures followed in making this survey are described in the “National Soil Survey Handbook” (USDA 1996). The soil maps made for conservation planning on individual farms prior to the start of the project soil survey were used as references.

Before the fieldwork began, preliminary boundaries of slopes and landforms were plotted stereoscopically on aerial photographs at a scale of 1:15,840. U.S. Geological Survey topographic maps, at a scale of

1:24,000, were studied to relate land and image features.

Soil scientists traversed the landscape on foot, examining the soils. In areas of the Westmoreland-Dekalb-Gilpin association and others where the soil pattern is complex, the traverses were spaced as close as 200 yards. In areas of the Morristown-Guernsey association on steep and very steep hillsides where land use is less intensive, traverses were about a quarter of a mile apart.

As the traverses were made, the soil scientists divided the landscape into segments based on the use and management of the soils. For example, a hillside would be separated from a terrace and a gently sloping ridgetop from a strongly sloping side slope. In most areas soil examinations along the traverses were made at points 100 to 300 yards apart, depending on the landscape and soil pattern.

Observations of such items as landforms, blown-down trees, vegetation, roadbanks, bedrock highwalls in surface-mined areas, and animal burrows were made continuously without regard to spacing. Soil boundaries were determined on the basis of soil examinations, observations, and aerial photo interpretation. With the aid of a 3/4-inch diameter soil sampling tube, bucket auger, or a spade, the soil material was examined to a depth of about 4 feet or to bedrock within a depth of 4 feet. The pedons described as typical were dug with shovels, spades, and spud bars.

Soil mapping was recorded on film positive mylars of aerial photographs taken in 1981. The drainageways were mapped in the field. Most of the cultural features were recorded from visual observations, but some were transferred from U.S. Geological Survey 7 1/2-minute topographic maps.

At the beginning of the survey, sample blocks were selected to represent the major landscapes in the county. These areas were mapped at a rate roughly half that used in the remainder of the county. Extensive notes were taken on the composition of map units in these preliminary study areas. As mapping progressed, these preliminary notes were modified and a final assessment of the composition of the individual map units was made. Transects were made to determine the composition of soil complexes, such as those of the Berks-Guernsey and Westmoreland-Dekalb complexes.

Samples for chemical and physical analyses and for analysis of engineering properties were taken from representative sites of several of the soils in the survey area. The chemical and physical analyses were made by the Soil Characterization Laboratory, Department of Agronomy, Ohio State University, Columbus, Ohio. The results of the analyses are stored in a computerized data file at the laboratory. The analyses for engineering properties were made by the Ohio Department of Transportation, Division of Highways, Bureau of Testing, Soils and Foundation Section, Columbus, Ohio. The laboratory procedures can be obtained by request from these two laboratories. The results of the studies can be obtained from the School of Natural Resources, Ohio State University, Columbus, Ohio; the Ohio Department of Natural Resources, Division of Soil and Water Conservation, Columbus, Ohio; and the Natural Resources Conservation Service, State Office, Columbus, Ohio.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of two or more major soils and some minor soils or miscellaneous areas. It is named for the major soils. The components of one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Westmoreland-Guernsey-Dekalb Association

Moderately deep to very deep, strongly sloping to very steep, well drained and moderately well drained soils formed in residuum and colluvium derived from siltstone, shale, limestone, and sandstone; on uplands

This association consists of strongly sloping and moderately steep soils on ridgetops and moderately steep to very steep soils on side slopes. The side slopes have been dissected by intermittent drainageways. Narrow flood plains and terraces are along the larger streams. The ridgetops range from several hundred to more than one thousand feet wide.

This association makes up about 23 percent of the county. It is about 25 percent Westmoreland soils, 25 percent Guernsey soils, 15 percent Dekalb soils, and 35 percent soils of minor extent (fig. 2).

Westmoreland soils are deep and very deep and are well drained. They are on steep and very steep side slopes and strongly sloping and moderately steep ridgetops. Permeability is moderate.

Guernsey soils are deep and very deep and are moderately well drained. They are on strongly sloping to steep benches and side slopes. They are subject to slippage in moderately steep and steep areas. Permeability is slow or moderately slow.

Dekalb soils are moderately deep and well drained. They are on strongly sloping ridgetops and steep and very steep side slopes. Permeability is rapid.

Of minor extent in this association are the Aaron, Bethesda, Coshocton, Fitchville, Gilpin, Glenford, Morristown, and Orrville soils. The moderately well drained Aaron soils do not have a discontinuity from colluvium to residuum like that of the Guernsey soils. They are on ridgetops. The very deep, well drained Bethesda and Morristown soils have a higher content of rock fragments throughout than the Guernsey and Westmoreland soils. They are in areas that have been disturbed by surface mining. The moderately well drained Coshocton soils have more sand and less clay in the subsoil that the Guernsey soils. They are on foot slopes. The very deep, somewhat poorly drained Fitchville soils and the very deep, moderately well drained Glenford soils have a lower content of rock fragments in the subsoil than the major soils. They are on lacustrine terraces. The moderately deep, well drained Gilpin soils have a lower content of rock fragments in the surface layer and subsoil than the Dekalb soils. They are on ridgetops and upper side slopes. The very deep, somewhat poorly drained Orrville soils are on flood plains.

Most of the strongly sloping and moderately steep areas of this association are used as cropland, pasture, or woodland. The steep and very steep areas are used as woodland. The strongly sloping ridgetops are moderately well suited to row crops and small grain and are well suited to hay and pasture. The moderately steep areas are poorly suited to row crops and small grain and are moderately well suited to pasture and hay. The steep and very steep areas are well suited and moderately well suited to woodland. The strongly sloping areas are poorly suited or moderately well suited to urban uses. The moderately steep areas are generally unsuited or poorly suited to urban uses. The steep and very steep areas are generally unsuited to most urban uses.

Water erosion and the slope are the major limitations. Wetness, the slow or moderately slow

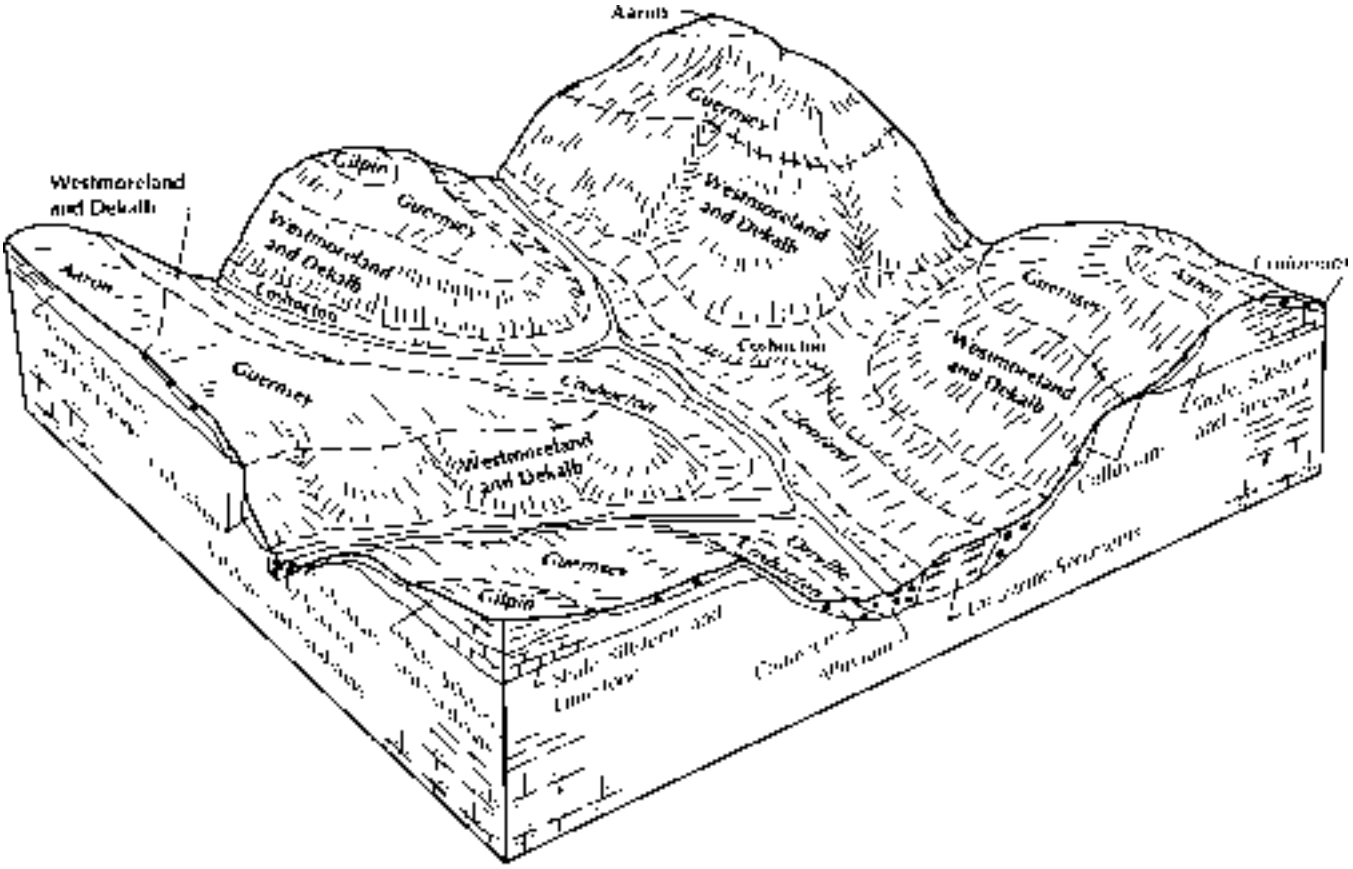

Figure 2.—Typical pattern of soils and parent material in the Westmoreland-Guernsey-Dekalb association.

permeability, and the susceptibility to slippage in areas of the Guernsey soils and the depth to bedrock in the Dekalb soils are additional limitations.

2. Westmoreland-Coshocton-Berks Association

Moderately deep to very deep, gently sloping to very steep, well drained and moderately well drained soils formed in residuum and colluvium derived from siltstone, shale, and sandstone; on uplands

This association consists of gently sloping to moderately steep soils on ridgetops and moderately steep to very steep soils on side slopes. The side slopes have been dissected by intermittent drainageways. Springs and seepy areas are common along the drainageways. Narrow flood plains and terraces are along the larger streams. The ridgetops range from several hundred to several thousand feet wide.

This association makes up about 10 percent of the county. It is about 25 percent Westmoreland soils, 20 percent Coshocton soils, 20 percent Berks soils, and 35 percent soils of minor extent.

Westmoreland soils are deep and very deep and are well drained. They are on strongly sloping to very steep ridgetops and side slopes. Permeability is moderate.

Coshocton soils are deep and very deep and are moderately well drained. They are on gently sloping to moderately steep ridgetops and side slopes. Permeability is slow or moderately slow.

Berks soils are moderately deep and well drained. They are on strongly sloping and moderately steep ridgetops and moderately steep to very steep side slopes. Permeability is moderate or moderately rapid.

Of minor extent in this association are the Bethesda, Fairpoint, Fitchville, Glenford, Guernsey, and Orrville soils. The very deep, well drained Bethesda and Fairpoint soils have a higher content of rock fragments throughout than the Coshocton and Westmoreland soils. They are in areas that have been disturbed by surface mining. The very deep, somewhat poorly drained Fitchville soils and the very deep, moderately well drained Glenford soils have a lower content of rock fragments in the subsoil than the major soils. They are on lacustrine terraces. The deep and very deep, moderately well drained Guernsey soils

have more clay in the upper part of the subsoil than the Coshocton soils. They are on side slopes. The very deep, somewhat poorly drained Orrville soils are on flood plains.

Most of the areas on ridgetops and the less sloping side slopes are used as cropland or pasture. The soils in these areas are well suited or moderately well suited to cropland, pasture, and woodland. The steeper areas are less suited to these uses, mainly because erosion is a hazard. The gently sloping and strongly sloping ridgetops are moderately well suited to most urban uses. The steeper areas are poorly suited or generally unsuited to urban uses.

Water erosion and the slope are the main limitations affecting the major land uses. Wetness and the restricted permeability in the Coshocton soils and the depth to bedrock in the Berks soils also are limitations.

3. Westmoreland-Dekalb-Gilpin Association

Moderately deep to very deep, gently sloping to very steep, well drained soils formed in residuum and colluvium derived from siltstone, shale, and sandstone; on uplands

This association consists of gently sloping to moderately steep soils on ridgetops and moderately steep to very steep soils on side slopes. The side slopes have been dissected by intermittent drainageways. Narrow flood plains and terraces are along the larger streams. The ridgetops range from several hundred to several thousand feet wide.

This association makes up about 25 percent of the county. It is about 35 percent Westmoreland and similar soils, 20 percent Dekalb soils, 20 percent Gilpin and similar soils, and 25 percent soils of minor extent (fig. 3).

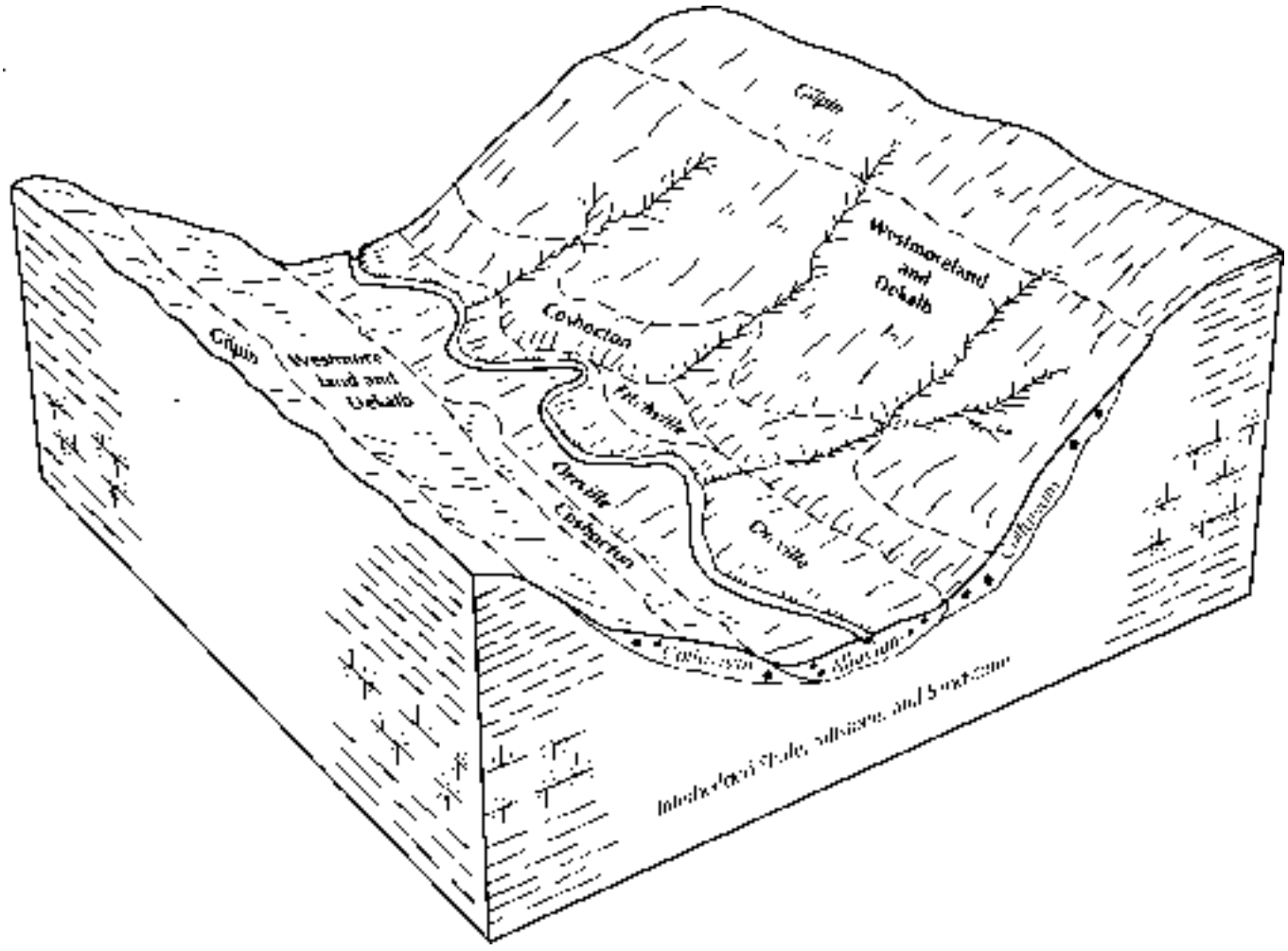

Figure 3.—Typical pattern of soils and parent material in the Westmoreland-Dekalb-Gilpin association.

Westmoreland soils are deep and very deep. They are on moderately steep to very steep side slopes. Permeability is moderate. Some areas of these soils are extremely bouldery.

Dekalb soils are moderately deep. They are on strongly sloping ridgetops and steep and very steep side slopes. Permeability is rapid. Some areas of these soils are extremely bouldery.

Gilpin soils are moderately deep. They are on gently sloping to moderately steep ridgetops and side slopes. Permeability is moderate.

Of minor extent in this association are the Aaron, Coshocton, Fitchville, Guernsey, Nolin, and Orrville soils. The deep, moderately well drained Aaron soils and the deep and very deep, moderately well drained Guernsey soils have more clay in the subsoil than the major soils. Aaron soils are on ridgetops. Guernsey soils are on side slopes. The deep and very deep, moderately well drained Coshocton soils are on foot slopes. The very deep, somewhat poorly drained Fitchville soils and the very deep, well drained Nolin soils have a lower content of rock fragments in the subsoil than the major soils. Fitchville soils are on lacustrine terraces. Nolin soils are on flood plains. The very deep, somewhat poorly drained Orrville soils are on flood plains.

Most of the areas on the gently sloping to moderately steep ridgetops and the moderately steep side slopes are used as cropland or pasture. The soils in these areas are well suited to poorly suited to these uses. The gently sloping to steep areas are well suited to woodland, and the very steep areas are moderately well suited to woodland. Most areas are generally unsuited to urban uses because of the slope and bedrock between depths of 20 and 40 inches in the Gilpin and Dekalb soils. The gently sloping to moderately steep ridgetops are well suited to poorly suited to urban uses. The steep and very steep areas are generally unsuited to urban uses.

Water erosion and the slope are the main limitations affecting the major land uses. The depth to bedrock in the Gilpin and Dekalb soils is an additional limitation.

4. Lowell-Morristown-Berks Association

Moderately deep to very deep, nearly level to very steep, well drained soils formed in residuum and colluvium derived from shale, siltstone, and limestone and in material mixed by surface mining; on uplands

This association is in and around areas that have been surface mined for coal. In some areas it consists of steep and very steep banks of spoil material that has been deposited parallel to a highwall, below a remnant of the original landscape. In other areas the spoil material has been regraded to eliminate the highwall or the entire landscape above the coal has been moved during mining and then regraded. These areas generally are regraded to a nearly level to moderately steep slope. The unmined areas consist of strongly sloping and moderately steep ridgetops and moderately steep to very steep side slopes.

This association makes up about 15 percent of the county. It is about 30 percent Lowell and similar soils, 30 percent Morristown soils, 20 percent Berks soils, and 20 percent soils of minor extent.

Lowell soils are deep and very deep. They are on strongly sloping and moderately steep ridgetops and moderately steep and steep side slopes. They are subject to slippage in moderately steep and steep areas. Permeability is moderately slow.

Morristown soils are very deep. They are in nearly level to very steep areas that have been surface mined for coal. They are subject to slippage in the moderately steep to very steep areas. Some areas of these soils are bouldery or stony. Permeability is moderately slow.

Berks soils are moderately deep. They are on strongly sloping to very steep ridgetops and side slopes. Permeability is moderate or moderately rapid.

Of minor extent in this association are the Bethesda, Coshocton, Gilpin, Orrville, and Westmoreland soils. The very deep, well drained Bethesda soils are more acid throughout than the Morristown soils and have a higher content of rock fragments than the Lowell soils. They are in areas that have been disturbed by surface mining. The deep and very deep, moderately well drained Coshocton soils and the deep and very deep, well drained Westmoreland soils have a lower content of rock fragments than the Morristown soils and less clay in the subsoil than the Lowell soils. Coshocton soils are on ridgetops and side slopes. Westmoreland soils are on side slopes. The moderately deep, well drained Gilpin soils have a lower content of rock fragments than the Berks soils. They are on ridgetops and side slopes. The very deep, somewhat poorly drained Orrville soils are on flood plains.

Most areas of this association are used as cropland, pasture, or woodland. Areas of the Morristown soils that have been regraded are used for hay or pasture. Most unreclaimed areas are in woodland. Most of the areas of Morristown soils are generally unsuited to row crops and small grain and are moderately well suited or poorly suited to hay, pasture, and woodland. The less sloping soils on ridgetops are moderately well suited or poorly suited to cropland and well suited or moderately well suited to hay and pasture. The steeper soils are generally

unsuited to cropland, poorly suited to pasture, and well suited or moderately well suited to woodland.

Water erosion, droughtiness, and the slope are the main limitations affecting the major land uses.

5. Morristown-Guernsey Association

Deep and very deep, nearly level to very steep, well drained and moderately well drained soils formed in material mixed by surface mining and in residuum and colluvium derived from shale, siltstone, and limestone; on uplands

This association is in and around extensive areas that have been surface mined for coal. In some areas it consists of steep and very steep banks of spoil material that has been deposited parallel to a highwall, below a remnant of the original landscape. In other areas the spoil material has been regraded to eliminate the highwall or the entire landscape above the coal has been moved during mining and then regraded. These areas generally are regraded to a nearly level to moderately steep slope.

This association makes up about 24 percent of the county. It is about 65 percent Morristown soils, 10 percent Guernsey soils, and 25 percent soils of minor extent.

Morristown soils are very deep and well drained. They are in nearly level to very steep areas that have been surface mined for coal. They are subject to slippage in moderately steep to very steep areas. Some areas are bouldery or stony. Permeability is moderately slow.

Guernsey soils are deep and very deep and are moderately well drained. They are on strongly sloping to steep benches and side slopes, above and below the Morristown soils. Guernsey soils are subject to slippage in moderately steep and steep areas. Permeability is slow or moderately slow.

Of minor extent in this association are the Berks, Bethesda, Dekalb, Fairpoint, Gilpin, Melvin, and Westmoreland soils. The moderately deep, well drained Berks, Dekalb, and Gilpin soils and the deep and very deep, well drained Westmoreland soils have less clay in the subsoil than the Guernsey soils. They are on side slopes and ridgetops above and below the Morristown soils. The very poorly drained Melvin soils are on flood plains. The very deep, well drained Bethesda and Fairpoint soils have a higher content of rock fragments throughout than the Guernsey soils and are more acid throughout than the Morristown soils. They are in areas that have been disturbed by surface mining.

Most of the regraded areas of the Morristown soils are used for hay or pasture. The steep and very steep unreclaimed areas are in woodland. The areas that have not been mined are used as cropland, pasture, or woodland. Most of the areas of Morristown soils are generally unsuited to row crops and small grain. The steeper areas are poorly suited or generally unsuited to hay, pasture, and urban uses. The less sloping areas are well suited to poorly suited to row crops, small grain, hay, pasture, woodland, and most urban uses. Morristown soils are moderately well suited and poorly suited to woodland.

Water erosion, droughtiness, and the slope are the main limitations affecting the major land uses. Stones and boulders on the surface of the Morristown soils and the moderately slow or slow permeability, the high shrink-swell potential, the seasonal high water table, and the susceptibility to slippage in areas of the Guernsey soils are additional limitations. Morristown soils are better suited to urban uses after they have settled.

6. Orrville-Glenford-Fitchville Association

Very deep, nearly level to strongly sloping, somewhat poorly drained and moderately well drained soils formed in alluvium and lacustrine deposits; on flood plains and terraces

This association is on nearly level flood plains and nearly level to strongly sloping terraces in valleys. The landscape consists of relatively broad flood plains and slightly higher terraces along the sides of valleys.

This association makes up about 1 percent of the county. It is about 40 percent Orrville soils, 30 percent Glenford soils, 15 percent Fitchville soils, and 15 percent soils of minor extent.

Orrville soils are somewhat poorly drained. They are on nearly level flood plains and are subject to occasional flooding. Permeability is moderate.

Glenford soils are moderately well drained. They are on gently sloping and strongly sloping slack-water terraces. Permeability is moderately slow.

Fitchville soils are somewhat poorly drained. They are on nearly level and gently sloping slack-water terraces. Permeability is moderately slow.

Of minor extent in this association are the Oshtemo and Tioga soils. The well drained Oshtemo soils have more sand in the subsoil than the Glenford and Fitchville soils. They are on terraces. The well drained Tioga soils have more sand in the subsoil than the Orrville soils. They are slightly higher on the flood plain than the Orrville soils.

This association is used as cropland, pasture, or woodland. The nearly level and gently sloping areas

are well suited to cropland, pasture, and woodland. The strongly sloping areas are moderately well suited to cropland and are well suited to hay, pasture, and woodland. The flood plains are generally unsuited to urban uses because of the hazard of flooding. The terraces are poorly suited to moderately well suited to most urban uses.

The flooding, wetness, and the moderately slow permeability are the main limitations affecting the major land uses.

7. Fitchville-Caneadea-Orrville Association

Very deep, nearly level and gently sloping, somewhat poorly drained soils formed in lacustrine deposits and alluvium; on terraces and flood plains

This association is on nearly level and gently sloping terraces in valleys and on nearly level flood plains. The landscape consists of relatively narrow flood plains and slightly higher terraces in valleys that have meandering streams.

This association makes up about 2 percent of the county. It is about 30 percent Fitchville soils, 30 percent Caneadea soils, 15 percent Orrville soils, and 25 percent soils of minor extent.

Fitchville soils are on nearly level and gently sloping slack-water terraces. Permeability is moderately slow.

Caneadea soils are on nearly level, low terraces. Permeability is very slow.

Orrville soils are on nearly level flood plains. They are subject to occasional flooding. Permeability is moderate.

Of minor extent in this association are the Canadice, Glenford, Nolin, and Melvin soils. The poorly drained Canadice soils have more clay in the subsoil than the Orrville and Fitchville soils. They are in depressions on low terraces. The moderately well drained Glenford soils have less clay in the subsoil than the Caneadea soils. They are on lacustrine terraces. The well drained Nolin soils are on flood plains. The poorly drained Melvin soils are in depressions on flood plains.

This association is used mainly as cropland or pasture. It is well suited or moderately well suited to cropland, pasture, and woodland and is poorly suited or generally unsuited to most urban uses.

Wetness and the moderately slow or very slow permeability are the main limitations affecting the major land uses. The flooding is an additional limitation in areas of the Orrville soils.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Coshocton silt loam, 2 to 6 percent slopes, is a phase of the Coshocton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Gilpin-Coshocton complex, 6 to 15 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such

areas have little or no soil material and support little or no vegetation. The map unit Dumps, mine, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Soil Descriptions

AaB—Aaron silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 30 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsoil:
9 to 16 inches—yellowish brown, friable silty clay loam
16 to 40 inches—yellowish brown and dark yellowish brown, mottled, firm silty clay and silty clay loam

Substratum:
40 to 59 inches—yellowish brown, mottled, firm silty clay

Bedrock:
59 to 63 inches—grayish brown, calcareous shale

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep
Root zone: Deep
Permeability: Slow
Available water capacity: High
Surface runoff: Medium
Shrink-swell potential: High

Composition

Aaron soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- Keene soils, which have less clay and more silt in the upper part of the subsoil than the Aaron soil and are on the less sloping parts of ridgetops
- Somewhat poorly drained soils in seepy areas

Similar inclusions:
- Soils that have a surface layer of silty clay loam

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, tilth, organic matter content, wetness in seepy areas
Management measures:
- Conservation tillage, contour farming, and cover crops help to control erosion and maintain tilth and organic matter content.
- Leaving crop residue on the surface and tilling within the proper range of moisture content help to prevent surface crusting.
- Installing subsurface drains helps to overcome the wetness.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in plowed or overgrazed areas
Management measures:
- Companion crops and conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, reduce the erosion hazard.
- Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
- Removing vines and the less desirable trees and shrubs helps to control plant competition.
- Applying gravel or crushed stone on haul roads and log landings helps to prevent the damage caused by low strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—shrink-swell potential, seasonal wetness; dwellings without basements—shrink-swell potential
Management measures:
- Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with

large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.

Septic tank absorption fields

Major management concerns: Seasonal wetness, slow permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the slow permeability.
• Installing perimeter drains helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Seasonal wetness, slow permeability
Management measures:
• Installing a drainage system and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour helps to control erosion.

Local roads and streets

Major management concerns: Shrink-swell potential, low strength, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4C
Pasture and hayland suitability group: A-6

AbC2—Aaron silty clay loam, 6 to 15 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 9 inches—friable silty clay loam that is dominantly brown but is dark grayish brown in the upper 2 inches; specks of yellowish brown material from the subsoil

Subsoil:
9 to 40 inches—yellowish brown, firm silty clay; mottled in the lower part

Substratum:
40 to 56 inches—yellowish brown and grayish brown, mottled, firm channery silty clay and silty clay

Bedrock:
56 to 60 inches—variegated light brownish gray, yellowish brown, olive yellow, and dusky red, soft shale

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep
Root zone: Deep
Permeability: Slow
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: High
Distinctive soil properties: Removal of part of the original surface layer through erosion

Composition

Aaron soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The well drained, moderately deep Berks and Gilpin soils on the higher parts of ridgetops
• Coshocton soils, which contain less clay in the subsoil than the Aaron soil and are near slope breaks
• Somewhat poorly drained soils in seepy areas
Similar inclusions:
• Soils that have a surface layer of silt loam
• Soils that have carbonates closer to the surface
• Soils that are better drained

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small

grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content, compaction, wetness in seepy areas
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to control erosion, maintain tilth, and reduce the runoff rate.
• Tilling within the proper range of moisture content helps to prevent compaction and the formation of clods.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in plowed or overgrazed areas
Management measures:
• Companion crops and conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings helps to prevent the damage caused by low strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—shrink-swell potential, seasonal wetness, erosion; dwellings without basements—shrink-swell potential, erosion
Management measures:
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover on construction sites help to control erosion.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Seasonal wetness, slow permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the slow permeability.
• Installing perimeter drains helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, seasonal wetness, slow permeability
Management measures:
• Grading the soil so that it has a more desirable slope, installing a drainage system, and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Shrink-swell potential, low strength, frost action, erosion
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.
• Building local roads and streets on the contour and seeding roadcuts help to control erosion.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4C
Pasture and hayland suitability group: A-6

BkC—Berks channery silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Convex ridgetops
Size of areas: 3 to 20 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable channery silt loam

Subsoil:
9 to 22 inches—yellowish brown, friable very channery and extremely channery silt loam

Bedrock:
22 to 24 inches—weathered siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate or moderately rapid
Available water capacity: Very low
Surface runoff: Medium or rapid

Composition

Berks soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- The moderately well drained Aaron soils, which have more clay in the subsoil and are in scattered seepy areas
- Gilpin soils, which have fewer shale fragments in the subsoil and are in landscape positions similar to those of the Berks soil

Similar inclusions:
- Soils that are less than 20 inches deep

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, droughtiness, tilth, organic matter content, wetness in seepy areas
Management measures:
- A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
- Installing subsurface drains helps to overcome the wetness in seepy areas of the included Aaron soils.

Pasture

Suitability: Well suited
Major management concerns: Erosion, droughtiness
Management measures:
- Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
- Companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality, limitations for log landings
Management measures:
- Mulching around seedlings reduces the seedling mortality rate.
- Cutting and filling to a more desirable slope improve sites for log landings.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—slope, depth to bedrock, erosion; dwellings without basements—slope, erosion
Management measures:
- Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
- The bedrock generally can be ripped by heavy construction equipment.
- Removing as little vegetation as possible, mulching, and establishing a temporary plant cover reduce the hazard of erosion during construction.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Depth to bedrock

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, stoniness
Management measures:
- Grading the soil so that it has a more desirable slope

and covering the surface with suitable material help to overcome the limitations.

Paths and trails

Suitability: Well suited

Local roads and streets

Major management concerns: Slope, erosion
Management measures:
• Local roads should be built across the slope.
• Seeding and mulching roadcuts help to control erosion.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4F
Pasture and hayland suitability group: F-1

BkD—Berks channery silt loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 25 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable channery silt loam

Subsoil:
7 to 20 inches—yellowish brown, friable very channery silt loam and extremely channery silt loam

Substratum:
20 to 28 inches—yellowish brown, friable extremely channery silt loam

Bedrock:
28 to 30 inches—weathered siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate or moderately rapid
Available water capacity: Very low
Surface runoff: Rapid

Composition

Berks soil and similar soils: 85 to 90 percent
Contrasting inclusions: 10 to 15 percent

Inclusions

Contrasting inclusions:
• The deep, moderately well drained Guernsey soils, which are on slightly concave slopes and have a few seeps and springs
• Gilpin soils, which have fewer shale fragments in the subsoil
Similar inclusions:
• Soils that have bedrock within a depth of 20 inches

Use and Management

Land Use: Dominant uses—pasture; other uses—cropland and woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness, tilth, organic matter content
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Installing subsurface drains in seepy areas of the included Guernsey soils helps to overcome the wetness.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Mulching around seedlings reduces the seedling mortality rate.
• Cutting and filling to a more desirable slope improve sites for log landings.

• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with basements—slope, bedrock at a depth of 20 to 40 inches; dwellings without basements—slope
Management measures:
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover on construction sites help to control erosion.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• The bedrock generally can be ripped by heavy construction equipment.
• Cutting and filling increase the hazard of slippage on hillsides in the included areas of Guernsey soils.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, depth to bedrock

Camp areas

Suitability: Poorly suited
Major management concerns: Stoniness, slope
Management measures:
• Removing the stones improves camp sites.
• Grading the soil so that it has a more desirable slope helps to overcome the slope.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: F-1

BkE—Berks channery silt loam, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 20 to 50 acres

Typical Profile

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 3 inches—dark brown, friable channery silt loam

Subsoil:
3 to 24 inches—yellowish brown, friable channery and extremely channery silt loam

Bedrock:
24 to 36 inches—weathered siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate or moderately rapid
Available water capacity: Very low
Surface runoff: Very rapid

Composition

Berks soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The deep, moderately well drained Guernsey soils, which have more clay in the subsoil and are on slightly concave slopes
• Gilpin soils, which have fewer fragments in the subsoil and are in landscape positions similar to those of the Berks soil
Similar inclusions:
• Soils that are deeper than 40 inches to bedrock

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay

Major management concerns: Erosion, slope, droughtiness
Management measures:
• A permanent plant cover is the best means of controlling erosion and overcoming droughtiness.
• No-till seeding helps to control erosion.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion, slope, droughtiness
Management measures:
• A permanent plant cover helps to control erosion.
• Because of the moderately deep root zone and droughtiness, this soil is better suited to forage species that have fibrous roots than to those that have deep roots.
• No-till planting helps to control erosion.
• Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Mulching around seedlings reduces the seedling mortality rate.

Buildings

Suitability: Generally unsuited
Major management concerns: Slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, depth to bedrock

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope, stoniness

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Management concerns: Slope, erosion
Management measures:
• Local roads should be built across the slope.
• Seeding and mulching roadcuts help to control erosion.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: F-2

BkF—Berks channery silt loam, 40 to 70 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 25 to more than 300 acres

Typical Profile

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 3 inches—dark brown, friable channery silt loam

Subsoil:
3 to 30 inches—yellowish brown, friable channery and extremely channery silt loam

Bedrock:
30 to 40 inches—weathered siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate or moderately rapid
Available water capacity: Very low
Surface runoff: Very rapid

Composition

Berks soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The deep, moderately well drained Guernsey soils,

which have more clay in the subsoil and are on slightly concave slopes
• Gilpin soils, which have fewer fragments in the subsoil and are in landscape positions similar to those of the Berks soil
Similar inclusions:
• Soils that are deeper than 40 inches to bedrock

Use and Management

Land Use: Dominant uses—woodland

Cropland

Suitability: Generally unsuited
Major management concerns: Erosion, slope

Pasture

Suitability: Generally unsuited
Major management concerns: Erosion, slope

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; seedling mortality; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Mulching around seedlings reduces the seedling mortality rate.

Buildings

Suitability: Generally unsuited
Major management concerns: Slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, depth to bedrock

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails:

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope, erosion
Management measures:
• Local roads should be built across the slope.
• Seeding and mulching roadcuts help to control erosion.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: H-1

BmC—Berks-Aaron complex, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 30 acres

Typical Profile

Berks

Surface layer:
0 to 7 inches—brown, friable channery silt loam

Subsoil:
7 to 16 inches—yellowish brown, friable very channery silt loam and extremely channery silt loam

Substratum:
16 to 22 inches—yellowish brown, friable extremely channery silt loam

Bedrock:
22 to 25 inches—weathered siltstone

Aaron

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsoil:
9 to 18 inches—yellowish brown, firm silty clay loam
18 to 50 inches—yellowish brown, mottled, firm silty clay and silty clay loam

Substratum:
50 to 60 inches—yellowish brown, mottled, firm channery silty clay loam

Bedrock:
60 to 62 inches—weathered shale

Soil Properties and Qualities

Drainage class: Berks—well drained; Aaron—moderately well drained
Seasonal high water table: Berks—at a depth of more than 6 feet; Aaron—1.5 to 3.0 feet
Depth class: Berks—moderately deep; Aaron—deep
Root zone: Berks—moderately deep; Aaron—deep
Permeability: Berks—moderate or moderately rapid; Aaron—slow
Available water capacity: Berks—very low; Aaron—high
Surface runoff: Berks—medium or rapid; Aaron—rapid
Shrink-swell potential: Berks—low; Aaron—high

Composition

Berks soil and similar soils: 50 to 65 percent
Aaron soil and similar soils: 20 to 35 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Intermingled areas of the moderately deep, well drained Gilpin soils, which are less shaly than the Berks soil
• Intermingled areas of the deep, well drained Westmoreland soils
• Intermingled areas of the deep, moderately well drained Coshocton soils, which are less clayey than the Aaron soil
• Small areas of shallow soils near the top of slopes
• Somewhat poorly drained soils in small, seepy areas
Similar inclusions:
• Soils that have fewer rock fragments in the surface layer
• Soils that are eroded and have a surface layer of silty clay loam
• Well drained soils that have a high content of clay in the subsoil

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content, droughtiness, wetness
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Installing subsurface drains helps to overcome the wetness in seepy areas of the Aaron soil.
• Tilling within the proper range of moisture content helps to prevent excessive compaction and the formation of clods.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness, compaction
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Restricted grazing during wet periods minimizes compaction of the Aaron soil.

Woodland

Suitability: Well suited
Major management concerns: Berks—seedling mortality, limitations for log landings; Aaron—plant competition, limitations for haul roads and log landings
Management measures:
• Mulching around seedlings reduces the seedling mortality rate on the Berks soil.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on the Aaron soil.
• Cutting and filling to a more desirable slope improve sites for log landings on the Berks soil.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Aaron soil.

Buildings

Suitability: Moderately well suited
Major management concerns in areas of the Berks soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Major management concerns in areas of the Aaron soil: Dwellings with basements—wetness, shrink-swell potential; dwellings without basements—shrink-swell potential
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Seeps and landslips should not be selected as building sites.

• The Berks soil is better suited to houses without basements than to houses with basements. The bedrock generally can be ripped by heavy construction equipment.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry in the Aaron soil.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Aaron soil.

Septic tank absorption fields

Suitability: Berks—generally unsuited; Aaron—poorly suited
Major management concerns: Berks—depth to bedrock; Aaron—wetness, restricted permeability
Management measures:
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface in areas of the Aaron soil.
• Enlarging the absorption area, installing an alternating absorption field system, and installing curtain drains improve the effectiveness of the absorption fields in areas of the Aaron soil.

Camp areas

Suitability: Moderately well suited
Major management concerns: Berks—slope, stoniness; Aaron—slope, wetness, restricted permeability
Management measures:
• Grading the soil so that it has a more desirable slope and covering the surface with suitable material help to overcome the limitations in areas of the Berks soil.
• Grading the soil so that it has a more desirable slope, installing a drainage system, and installing a large absorption field for the disposal of wastewater help to overcome the limitations in areas of the Aaron soil.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Berks—none; Aaron—erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Aaron soil.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Berks—slope; Aaron—shrink-swell potential
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by low strength in areas of the Aaron soil.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: Berks—4F; Aaron—4C
Pasture and hayland suitability group: Berks—F-1; Aaron—A-6

BnD—Berks-Guernsey complex, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Distinctive landscape features: Guernsey—slips and seeps on hillsides
Size of areas: 5 to 100 acres

Typical Profile

Berks

Surface layer:
0 to 5 inches—brown, friable channery silt loam

Subsoil:
5 to 15 inches—yellowish brown, friable very channery silt loam and extremely channery silt loam

Substratum:
15 to 22 inches—yellowish brown, friable extremely channery silt loam

Bedrock:
22 to 24 inches—weathered siltstone

Guernsey

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsoil:
6 to 14 inches—yellowish brown, friable silty clay loam
14 to 42 inches—yellowish brown, dark brown, and reddish brown, mottled, firm silty clay

Substratum:
42 to 80 inches—dark brown and light olive brown, mottled, firm silty clay, silty clay loam, and channery silty clay loam

Soil Properties and Qualities

Drainage class: Berks—well drained; Guernsey—moderately well drained
Seasonal high water table: Berks—at a depth of more than 6 feet; Guernsey—1.5 to 3.0 feet
Depth class: Berks—moderately deep; Guernsey—deep or very deep
Root zone: Berks—moderately deep; Guernsey—deep or very deep
Permeability: Berks—moderate or moderately rapid; Guernsey—slow or moderately slow
Available water capacity: Berks—very low; Guernsey—moderate
Surface runoff: Berks—very rapid; Guernsey—rapid
Shrink-swell potential: Berks—low; Guernsey—high

Composition

Berks soil and similar soils: 50 to 65 percent
Guernsey soil and similar soils: 20 to 35 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Intermingled areas of the deep, moderately well drained Coshocton soils, which are less clayey than the Guernsey soil
• Intermingled areas of the moderately deep, well drained Gilpin soils, which have a lower content of shale than the Berks soil
• Small areas of shallow soils near the top of slopes
• Somewhat poorly drained soils in small, seepy areas
Similar inclusions:
• Soils that have fewer rock fragments in the surface layer
• Soils that are eroded and have a surface layer of silty clay loam
• Soils that are redder and have a high content of clay in the subsoil

Use and Management

Land Use: Dominant uses—pasture and woodland; other uses—cropland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content, droughtiness, wetness
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Tilling within the proper range of moisture content helps to prevent excessive compaction and the formation of clods in the Guernsey soil.
• Installing subsurface drains helps to overcome the wetness in seepy areas of the Guernsey soil.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness, compaction
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Restricted grazing during wet periods minimizes compaction of the Guernsey soil.

Woodland

Suitability: Well suited
Major management concerns: Berks and Guernsey—seedling mortality, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Guernsey—erosion, plant competition
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Laying out roads and skid trails on or near the contour, establishing water bars, and establishing a vegetative cover help to control erosion on the Guernsey soil.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Haul roads and log landings should not be built on active landslips.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Guernsey soil.
• Mulching around seedlings reduces the seedling mortality rate on the Berks soil.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south aspects of the Guernsey soil.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on the Guernsey soil.

Buildings

Suitability: Poorly suited
Major management concerns in areas of the Berks soil: Dwellings with and without basements—slope
Major management concerns in areas of the Guernsey soil: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—slope, slippage, shrink-swell potential
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Seeps and landslips should not be selected as building sites.
• Installing a drainage system in seepy areas reduces the hazard of slippage.
• The Berks soil is better suited to houses without basements than to houses with basements. The bedrock generally can be ripped with construction equipment.
• Waterproofing basement walls and installing drains at the base of footings in areas of the Guernsey soil help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Guernsey soil.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Berks—depth to bedrock, slope; Guernsey—wetness, restricted permeability, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Berks—slope, stoniness; Guernsey—slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the slope.
• Covering the surface with suitable material helps to overcome the stoniness of the Berks soil.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Berks—slope; Guernsey—erosion
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Guernsey soil.

Local roads and streets

Suitability: Berks—moderately well suited; Guernsey—poorly suited
Major management concerns: Berks—slope; Guernsey—shrink-swell potential, low strength, slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by low strength in areas of the Guernsey soil.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: Berks—4R on north aspects, 3R on south aspects; Guernsey—4R
Pasture and hayland suitability group: Berks—F-1; Guernsey—A-2

BnE—Berks-Guernsey complex, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Distinctive landscape features: Guernsey—seeps and landslips are common
Size of areas: 10 to 200 acres

Typical Profile

Berks

Surface layer:
0 to 4 inches—brown, friable channery silt loam

Subsoil:
4 to 23 inches—yellowish brown, friable channery silt loam, very channery silt loam, and extremely channery silt loam

Substratum:
23 to 28 inches—yellowish brown, friable extremely channery silt loam

Bedrock:
28 to 30 inches—weathered siltstone

Guernsey

Surface layer:
0 to 8 inches—very dark grayish brown and brown, friable silt loam

Subsoil:
8 to 20 inches—yellowish brown, friable silt loam and silty clay loam
20 to 60 inches—yellowish brown, mottled, firm silty clay, silty clay loam, and channery silty clay loam

Substratum:
60 to 80 inches—yellowish brown, mottled, firm channery silty clay loam and silty clay

Soil Properties and Qualities

Drainage class: Berks—well drained; Guernsey—moderately well drained
Seasonal high water table: Berks—at a depth of more than 6 feet; Guernsey—1.5 to 3.0 feet
Depth class: Berks—moderately deep; Guernsey—deep or very deep
Root zone: Berks—moderately deep; Guernsey—deep or very deep
Permeability: Berks—moderate or moderately rapid; Guernsey—slow or moderately slow
Available water capacity: Berks—very low; Guernsey—moderate
Surface runoff: Very rapid
Shrink-swell potential: Berks—low; Guernsey—high

Composition

Berks soil and similar soils: 50 to 65 percent
Guernsey soil and similar soils: 20 to 35 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Intermingled areas of the deep, moderately well drained Coshocton soils, which are less clayey than the Guernsey soil
• Intermingled areas of the moderately deep, well drained Gilpin soils, which have a lower content of shale than the Berks soil
• Intermingled areas of the deep, well drained Westmoreland soils
• Small areas of shallow soils near the top of slopes
• Somewhat poorly drained soils in small, seepy areas
Similar inclusions:
• Soils that are redder and have a high content of clay in the subsoil

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, droughtiness, compaction, clodding
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• No-till seeding helps to control erosion and conserve moisture.
• Tilling within the proper range of moisture content helps to prevent excessive compaction and the formation of clods in areas of the Guernsey soil.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, slope
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• Restricted grazing during wet periods helps to prevent compaction of the Guernsey soil.
• Special equipment is needed because of the slope.

Woodland

Suitability: Moderately well suited
Major management concerns: Berks and Guernsey—seedling mortality, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Guernsey—erosion, plant competition
Management measures:
• Laying out roads and skid trails on or near the contour, establishing water bars, and establishing a vegetative cover help to control erosion on the Guernsey soil.
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Mulching around seedlings reduces the seedling mortality rate on the Berks soil.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on the Guernsey soil.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Haul roads and log landings should not be built on active landslips.

• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Guernsey soil.

Buildings

Suitability: Generally unsuited
Major management concerns in areas of the Berks soil: Dwellings with and without basements—slope
Major management concerns in areas of the Guernsey soil: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—slope, slippage, shrink-swell potential

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Berks—depth to bedrock, slope; Guernsey—wetness, restricted permeability, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Berks—slope, stoniness; Guernsey—slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Berks—slope; Guernsey—slope, erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Guernsey soil.
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Berks—slope; Guernsey—shrink-swell potential, low strength, slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material and installing a drainage system help to prevent the damage caused by low strength and by shrinking and swelling in areas of the Guernsey soil.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: Berks—4R on north aspects, 3R on south aspects; Guernsey—4R
Pasture and hayland suitability group: Berks—F-2; Guernsey—A-3

BpB—Bethesda channery silty clay loam, 0 to 8 percent slopes

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Ridgetops
Size of areas: 15 to 200 acres

Typical Profile

Surface layer:
0 to 4 inches—dark yellowish brown, friable channery silty clay loam

Substratum:
4 to 80 inches—dark grayish brown, dark gray, and yellowish brown, firm very channery and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Slow or medium
Distinctive soil properties: Mixture of rock fragments and partly weathered, fine-earth material; rock fragments mostly subrounded siltstone, shale, sandstone, and coal

Composition

Bethesda soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small depressions and pockets where water collects after periods of heavy rainfall
• Small areas of soils that are ultra acid
• Soils having a surface layer that appears moist because of the high concentration of salts
Similar inclusions:
• Soils that have a surface layer of very channery silty clay loam

• Soils that are medium acid to neutral in the substratum

Use and Management

Land Use: Dominant uses—woodland; other uses—idle land

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Droughtiness, erosion, tilth, rock fragments in the surface layer
Management measures:
• No-till seeding helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Droughtiness, erosion and compaction in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Seedling mortality, plant competition, equipment limitation
Management measures:
• Mulching around seedlings reduces the seedling mortality rate.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• The surface layer is sticky when wet. Applying gravel or crushed stone on haul roads and log landings improves traction.

Buildings

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Dwellings with and without basements—unstable fill, erosion
Management measures:
• Onsite investigation is needed to determine suitability.
• This soil should be allowed to settle before it is used as a building site.
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover help to control erosion on construction sites.

Septic tank absorption fields

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Moderately slow permeability, unstable fill
Management measures:
• Onsite investigation is needed to determine suitability.
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the restricted permeability.
• This soil should be allowed to settle before installing septic tank absorption fields.

Camp areas

Suitability: Moderately well suited
Major management concerns: Moderately slow permeability, stoniness
Management measures:
• Onsite investigation is needed to determine suitability.
• Installing a large absorption field for the disposal of wastewater compensates for the moderately slow permeability of the soil.
• The stones can be removed.

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 4F
Pasture and hayland suitability group: E-3

BpD—Bethesda channery silty clay loam, 8 to 25 percent slopes

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Ridgetops, benches, and side slopes
Distinctive landscape features: Rills and gullies have formed near slope breaks; landslips in some areas

Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 4 inches—brown, friable channery silty clay loam

Substratum:
4 to 80 inches—yellowish brown and brown, firm very channery loam, very channery silty clay loam, very channery clay loam, and extremely channery loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Rapid or very rapid
Distinctive soil properties: A few stones on the surface and throughout the soil

Composition

Bethesda soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small intermittent and perennial ponds
• Small areas of steep soils on side slopes of spoil banks
• Ultra acid soils that have moist spots of soluble salts on the surface in places
Similar inclusions:
• Soils that have a surface layer of very channery silty clay loam
• Soils that are medium acid to neutral in the substratum

Use and Management

Land Use: Dominant uses—woodland; other uses—hayland and pasture

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, droughtiness, stoniness
Management measures:
• No-till seeding helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; plant competition; droughtiness; seedling mortality; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building logging roads and skid trails on or near the contour, establishing water bars, and establishing a vegetative cover help to control erosion.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate.
• Species that can withstand the droughtiness should be selected for planting.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building skid trails on the contour facilitates the use of equipment.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope, unstable fill

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Moderately well suited

Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope, unstable fill
Management measures:
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.
• Building local roads and streets on the contour after the soil has settled reduces the angle of incline.
• Onsite investigation is needed to determine suitability.
• Providing suitable base material helps to prevent the damage caused by frost action.
• Removing as little vegetation as possible, mulching, and planting temporary seedings help to control erosion during construction.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 4R
Pasture and hayland suitability group: E-3

BpF—Bethesda channery silty clay loam, 25 to 70 percent slopes

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Side slopes
Distinctive landscape features: Landslips in some areas
Size of areas: 10 to 50 acres

Typical Profile

Surface layer:
0 to 4 inches—dark grayish brown, friable channery silty clay loam

Substratum:
4 to 30 inches—brown, friable, very channery silty clay loam
30 to 80 inches—yellowish brown, firm, very channery and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid
Distinctive soil properties: A few stones on the surface and throughout the soil

Composition

Bethesda soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Intermittent and perennial ponds
• Long, narrow bedrock highwalls as high as 80 feet
• Strongly sloping and moderately steep areas on spoil ridges
Similar inclusions:
• Soils that are medium acid to neutral in the substratum
• Soils that have a surface layer of very channery silty clay loam
• Ultra acid soils that are a mixture of fire clay and coal and are toxic to most plants

Use and Management

Land Use: Dominant uses—woodland and idle land

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Slope, hazard of erosion, droughtiness

Pasture

Suitability: Generally unsuited
Major management concerns: Slope, erosion, droughtiness

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; plant competition; seedling mortality; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building logging roads and skid trails on or near the contour, establishing water bars, and establishing a vegetative cover help to control erosion.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

• Mulching around seedlings reduces the seedling mortality rate.
• Only trees that can tolerate the strongly acid to extremely acid conditions in the root zone should be planted.
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Haul roads and log landings should not be built on active landslips.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, erosion, unstable fill, slippage

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Moderately slow permeability, slope, erosion, unstable soil, slippage

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Slope, erosion, unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Local roads should be built across the slope.
• Seeding and mulching roadcuts help to control erosion.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: H-1

BsD—Brookside silty clay loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Foot slopes
Distinctive landscape features: Seeps, springs, and landslips
Size of areas: 10 to 15 acres

Typical Profile

Surface layer:
0 to 8 inches—dark brown, friable silty clay loam

Subsoil:
8 to 25 inches—dark yellowish brown, firm silty clay
25 to 60 inches—dark yellowish brown, light olive brown, and olive brown, mottled, firm silty clay

Substratum:
60 to 80 inches—olive brown, mottled, firm silty clay and channery silty clay

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 2.5 to 4.0 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately slow
Available water capacity: Moderate
Surface runoff: Very rapid
Shrink-swell potential: High

Composition

Brookside soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Wetter soils in concave areas or in areas below seeps and springs
Similar inclusions:
• Soils that have a surface layer of silt loam

Use and Management

Land Use: Dominant uses—pasture and cropland; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content, compaction
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth and the content of organic matter, reduce the runoff rate, and prevent excessive soil loss.
• Tilling within the proper range of moisture content helps to prevent compaction and clodding.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion and compaction in overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope, shrink-swell potential, slippage
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Cutting and filling increase the hazard of slippage on hillsides, but installing a drainage system in seepy areas reduces the hazard.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, restricted permeability, wetness

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the slope.

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope, slippage, shrink-swell potential
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling and by frost action.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Cutting and filling increase the hazard of slippage on hillsides, but installing a drainage system in seepy areas reduces the hazard.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—5R; south aspects—4R
Pasture and hayland suitability group: A-2

Ca—Canadice silty clay loam

Setting

Landform: Terraces
Position on the landform: Broad flats and depressions on low terraces along streams
Slope: 0 to 2 percent
Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown, firm silty clay loam

Subsoil:
7 to 45 inches—dark gray, mottled, firm silty clay and silty clay loam

Substratum:
45 to 80 inches—gray, firm silty clay; mottled in the upper part

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Near the surface
Depth class: Very deep
Root zone: Very deep but restricted by the seasonal high water table and the high content of clay
Permeability: Very slow
Available water capacity: Moderate or high
Surface runoff: Very slow

Composition

Canadice soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Caneadea soils on slight rises
• The well drained Nolin soils on narrow flood plains adjacent to oxbows
Similar inclusions:
• Soils that have a surface layer of silt loam

Use and Management

Land Use: Dominant uses—cropland or woodland; other uses—pasture

Cropland

Suitability: Poorly suited to corn, small grain, and hay
Major management concerns: Ponding, very slow permeability, wetness, compaction, clodding
Management measures:
• A surface drainage system and land leveling help to overcome the wetness.
• Tilling within the proper range of moisture content is important because the soil becomes compacted and cloddy if worked when it is wet and sticky.

Pasture

Suitability: Poorly suited
Major management concerns: Compaction in overgrazed areas, wetness
Management measures:
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.
• Maintaining stands of deep-rooted legumes is difficult because of the wetness.

Woodland

Suitability: Poorly suited
Major management concerns: Seedling mortality; windthrow hazard; plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Logging should be done when the soil is frozen or during the drier parts of the year.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate.
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Generally unsuited
Major management concerns: Seasonal wetness, ponding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Seasonal wetness, very slow permeability, ponding

Camp areas

Suitability: Generally unsuited

Major management concerns: Seasonal wetness, very slow permeability

Paths and trails

Suitability: Generally unsuited
Major management concerns: Seasonal wetness

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, seasonal wetness, ponding
Management measures:
• Providing suitable base material helps to prevent the damage caused by low strength.
• Installing a drainage system and providing suitable fill material help to prevent the damage caused by wetness and ponding.

Interpretive Groups

Land capability classification: IVw
Woodland ordination symbol: 2W
Pasture and hayland suitability group: C-2

CcA—Caneadea silty clay loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Terrace treads
Size of areas: 5 to 300 acres

Typical Profile

Surface layer:
0 to 9 inches—dark grayish brown, firm silty clay loam

Subsoil:
9 to 55 inches—grayish brown and yellowish brown, mottled, firm silty clay

Substratum:
55 to 80 inches—dark yellowish brown, mottled, firm laminated silty clay loam and silty clay

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1.0 to 2.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Very slow
Available water capacity: Moderate
Surface runoff: Slow

Composition

Caneadea soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The poorly drained Canadice soils in depressions
Similar inclusions:
• Soils that have a surface layer of silt loam

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Moderately well suited to corn, small grain, and hay
Major management concerns: Seasonal wetness, tilth, compaction, clodding
Management measures:
• A surface drainage system helps to remove excess surface water.
• Installing a subsurface drainage system helps to overcome the wetness in the subsoil.
• Cover crops and a system of conservation tillage that leaves crop residue on the surface improve tilth and increase the rate of water infiltration.
• Tilling within the proper range of moisture content is important because the soil becomes compacted and cloddy if worked when it is wet and sticky.

Pasture

Suitability: Moderately well suited
Major management concerns: Compaction and poor tilth in overgrazed areas
Management measures:
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction and maintain the rate of water infiltration.

Woodland

Suitability: Moderately well suited
Major management concerns: Seedling mortality; windthrow hazard; plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Planting techniques that spread the roots of seedings and increase soil-root contact reduce the seedling mortality rate.
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

• Logging should be done when the soil is frozen or during the drier parts of the year.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—seasonal wetness, shrink-swell potential
Management measures:
• Building sites should be landscaped so that excess water drains away from foundations.
• Waterproofing basement walls, installing drains at the base of footings, and installing sump pumps help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting walls with large spread footings, and backfilling with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Seasonal wetness, very slow permeability
Management measures:
• Installing perimeter drains around the absorption field helps to overcome the wetness if drainage outlets are available.
• Enlarging the absorption area helps to overcome the restricted permeability.
• An aeration septic tank absorption field that has a suitable outlet is an effective alternative system.

Camp areas

Suitability: Poorly suited
Major management concerns: Seasonal wetness, very slow permeability
Management measures:
• Installing a drainage system and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• A drainage system is needed.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 4C
Pasture and hayland suitability group: C-2

CnB—Coshocton silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Position on the landform: Smooth or convex ridgetops
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsoil:
9 to 25 inches—yellowish brown, friable silt loam; mottled in the lower part
25 to 40 inches—yellowish brown, mottled, firm silty clay loam and channery silty clay loam

Substratum:
40 to 52 inches—yellowish brown, mottled, firm channery silty clay loam

Bedrock:
52 to 60 inches—weathered shale

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderately slow or slow
Available water capacity: Moderate
Surface runoff: Medium

Composition

Coshocton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep, well drained Gilpin soils near slope breaks
• Guernsey soils, which have more clay in the subsoil and are in concave areas

• Keene soils, which have a lower content of sand and rock fragments in the upper part of the subsoil and are in the less sloping areas

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, tilth, organic matter content, wetness
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour farming, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Tilling within the proper range of moisture content helps to prevent crusting and excessive compaction.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, and companion crops reduce the hazard of erosion.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—seasonal high water table; dwellings without basements—seasonal high water table, shrink-swell potential
Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Seasonal high water table, slow or moderately slow permeability
Management measures:
• Installing perimeter drains, enlarging the absorption area, and installing an alternating absorption field system improve the effectiveness of the absorption fields.

Camp areas

Suitability: Moderately well suited
Major management concerns: Seasonal high water table
Management measures:
• Installing a drainage system helps to overcome the wetness.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour helps to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, frost action
Management measures:
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-6

CnC—Coshocton silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Smooth or convex ridgetops and side slopes
Distinctive landscape features: Seeps and springs

Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 19 inches—yellowish brown, friable silty clay loam
19 to 50 inches—yellowish brown, mottled, firm silty clay loam and channery silty clay loam

Substratum:
50 to 80 inches—yellowish brown, mottled, firm channery silty clay and channery silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderately slow or slow
Available water capacity: Moderate
Surface runoff: Medium or rapid

Composition

Coshocton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep, well drained Gilpin soils near slope breaks
• Guernsey soils, which have more clay in the subsoil and are in scattered seepy areas
• Keene soils, which have a lower content of sand and rock fragments in the upper part of the subsoil and are in concave areas
Similar inclusions:
• Soils that are well drained

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland (fig. 4)

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, crusting, tilth, organic matter content, wetness
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—seasonal high water table; dwellings without basements—seasonal high water table, shrink-swell potential, slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Seasonal high water table, slow or moderately slow permeability
Management measures:
• Installing curtain drains, enlarging the absorption

Figure 4.—A Christmas tree plantation on a ridgetop in an area of Coshocton silt loam, 6 to 15 percent slopes.

area, installing the absorption field on the contour, and installing an alternating absorption field system improve the effectiveness of the absorption fields.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, seasonal high water table
Management measures:
• Grading the soil so that it has a more desirable slope and installing a drainage system help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, frost action
Management measures:
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-6

CnD—Coshocton silt loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position: Foot slopes and side slopes

Distinctive landscape features: Scattered landslips, seeps, and springs
Size of areas: 10 to 100 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 14 inches—yellowish brown, friable silt loam
14 to 45 inches—yellowish brown, mottled, firm channery silty clay loam

Substratum:
45 to 51 inches—yellowish brown, mottled, friable channery loam
51 to 80 inches—yellowish brown, firm channery and very channery clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Slow or moderately slow
Available water capacity: Moderate
Surface runoff: Rapid

Composition

Coshocton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep, well drained Gilpin soils near slope breaks
• Guernsey soils, which contain more clay in the subsoil and are more susceptible to slippage, in concave areas
Similar inclusions:
• Soils that are better drained and are not mottled in the subsoil

Use and Management

Land Use: Dominant uses—pasture and cropland; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content, wetness, crusting
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, maintain tilth and organic matter content, and prevent crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion, compaction in overgrazed or plowed areas
Management measures:
• Companion crops and conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Restricting grazing during wet periods minimizes compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition on north aspects; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on north aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—slope; dwellings with and without basements—erosion and slippage on hillsides in the included areas of Guernsey soils
Management measures:
• Removing as little vegetation as possible, mulching,

and establishing a temporary plant cover on construction sites help to control erosion.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Installing a drainage system in seepy areas reduces the hazard of slippage.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Generally unsuited
Major management hazards: Wetness, slope, slow or moderately slow permeability

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, slope, frost action
Management measures:
• Constructing roads and streets on the contour and seeding roadcuts help to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: A-2

DkC—Dekalb channery loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 10 acres

Typical Profile

Surface layer:
0 to 8 inches—brown, friable channery loam

Subsoil:
8 to 27 inches—yellowish brown and strong brown, friable very channery loam and very channery sandy loam

Substratum:
27 to 32 inches—yellowish brown, friable extremely channery sandy loam

Bedrock:
32 to 36 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Rapid
Available water capacity: Very low
Surface runoff: Medium or rapid

Composition

Dekalb soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Gilpin soils, which have a higher content of clay and a lower content of coarse fragments and are on the less sloping parts of the landscape
Similar inclusions:
• Soils that are deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay

Major management concerns: Erosion, droughtiness, tilth, organic matter content, leaching of nutrients
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, conserve moisture, control erosion, and maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Because of the very low available water capacity, this soil is better suited to crops that mature early in the growing season.
• Timely applications of lime and fertilizer are needed because of rapid leaching.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality, limitations for haul roads and log landings
Management measures:
• Mulching around seedlings reduces the seedling mortality rate.
• Blasting is required if deep excavations are necessary during the construction of haul roads and log landings.
• Haul roads and log landings should be built on better suited soils nearby.
• Cutting and filling to a more desirable slope improve sites for log landings.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—depth to bedrock, slope, erosion; dwellings without basements—depth to bedrock, slope, erosion, large stones
Management measures:
• Blasting may be necessary in the deeper excavations.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover on construction sites help to control erosion.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Depth to bedrock, poor filter

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, stoniness
Management measures:
• Grading the soil so that it has a more desirable slope and removing stones help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Large stones
Management measures:
• Large stones can be removed.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Depth to bedrock, slope, large stones
Management measures:
• Blasting may be necessary in the deeper excavations.
• Building local roads and streets on the contour reduces the angle of incline.
• Large stones can be removed.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4F
Pasture and hayland suitability group: F-1

Dm—Dumps, mine

Setting

Landform: Uplands
Position on the landform: On ridgetops and side slopes and in collection ponds that are covered or filled with waste from coal washing processes
Size of areas: 10 to 200 acres

Composition

Dumps, mine, and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Areas of natural soils that have not been covered

with waste from coal washing processes
• Areas of Morristown soils that have not been covered with waste from coal washing processes

Use and Management

Land Use: Dominant uses—idle land; other uses—dumping areas for waste material from coal washing processes

Management measures:
• Onsite investigation is needed to determine the suitability for specific uses.

Interpretive Groups

Land capability classification: Not assigned
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: Not assigned

FaB—Fairpoint silty clay loam, 0 to 8 percent slopes

Setting

Landform: Reclaimed surface mined areas in the uplands
Position on the landform: Graded and reclaimed ridgetops
Size of areas: 5 to 30 acres

Typical Profile

Surface layer:
0 to 7 inches—yellowish brown, friable silty clay loam

Substratum:
7 to 80 inches—dark grayish brown and yellowish brown, firm very channery and extremely channery clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Slow or medium

Composition

Fairpoint soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small depressions and pockets where water collects after periods of heavy rainfall
• Soils in areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining and were covered during reclamation
Similar inclusions:
• Soils that have a surface layer of channery silty clay loam

Use and Management

Land Use: Dominant uses—hayland; other uses—cropland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• A cropping sequence that includes grasses and legumes, incorporation of crop residue into the surface layer, contour stripcropping, and a system of conservation tillage that leaves crop residue on the surface help to control erosion, conserve moisture, and increase the rate of water infiltration.
• Because of the limited available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Limitations for haul roads and log landings
Management measures:
• The surface layer is sticky when wet. Applying gravel or crushed stone on haul roads and log landings improves traction.

Buildings

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Dwellings with and without basements—unstable fill
Management measures:
• This soil should be allowed to settle before it is used as a building site.
• Onsite investigation is needed to determine suitability.
• Backfilling around foundations with material that has a low shrink-swell potential and supporting the walls with large spread footings help to prevent the structural damage caused by shrinking and swelling.
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover help to control erosion on construction sites.

Septic tank absorption fields

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Restricted permeability, unstable fill
Management measures:
• This soil should be allowed to settle before installing septic tank absorption fields.
• Onsite investigation is needed to determine suitability.
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.

Camp areas

Suitability: Moderately well suited
Major management concerns: Moderately slow permeability
Management measures:
• Installing a large absorption field for the disposal of wastewater compensates for the moderately slow permeability of the soil.

Paths and trails

Suitability: Well suited
Major management concerns: None

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Unstable fill
Management measures:
• The soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: B-4

FaD—Fairpoint silty clay loam, 8 to 25 percent slopes

Setting

Landform: Reclaimed surface mined areas in the uplands
Position on the landform: Graded and reclaimed ridgetops, benches, and side slopes
Distinctive landscape features: Landslips in some areas
Size of areas: 5 to 30 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silty clay loam

Substratum:
7 to 80 inches—dark grayish brown, yellowish brown, and brown, firm very channery and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid

Composition

Fairpoint soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Areas below the original elevation of the coal that were never excavated but were affected during mining and covered during reclamation
Similar inclusions:
• Soils that have a surface layer of channery silty clay loam

Use and Management

Land Use: Dominant uses—hayland; other uses—pasture

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management hazards: Erosion, droughtiness
Management measures:
• No-till seeding helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Droughtiness, erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building skid trails on the contour facilitates the use of equipment.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill, susceptibility to slippage on hillsides

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, unstable fill, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Slope, unstable fill, hazard of slippage on hillsides
Management measures:
• Onsite investigation is needed to determine suitability.
• This soil should be allowed to settle before building roads and streets.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: B-4

FaE—Fairpoint silty clay loam, 25 to 40 percent slopes

Setting

Landform: Reclaimed surface mined areas in the uplands
Position on the landform: Graded and reclaimed side slopes
Distinctive landscape features: Landslips in some areas
Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 3 inches—yellowish brown, friable silty clay loam

Substratum:
3 to 12 inches—yellowish brown, friable silty clay loam
12 to 80 inches—yellowish brown, light olive brown, dark gray, gray, and very dark gray, firm very channery silty clay loam, extremely channery silty clay loam, extremely channery clay loam, and very channery clay loam

Soil Properties and Qualities

Drainage class: Well drained

Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid

Composition

Fairpoint soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Areas below the original elevation of the coal that were never excavated but were affected during mining and covered during reclamation
Similar inclusions:
• Soils that have a surface layer of channery silty clay loam

Use and Management

Land Use: Dominant uses—hayland; other uses—pasture

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management hazards: Erosion, droughtiness, slope
Management measures:
• No-till seeding helps to control erosion and conserve moisture.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion, droughtiness, slope, compaction
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during wet periods helps to prevent excessive compaction.
• Special equipment is needed because of the slope.

Woodland

Suitability: Moderately well suited
Major management concerns: Limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building skid trails on the contour facilitates the use of equipment.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Buildings with and without basements—slope, unstable fill, susceptibility to slippage on hillsides

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, moderately slow permeability, unstable fill, susceptibility to slippage on hillsides

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Slope, erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Slope, unstable fill, slippage on hillsides
Management measures:
• Onsite investigation is needed to determine suitability.
• This soil should be allowed to settle before building roads and streets.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: E-2

FcA—Fitchville silt loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Terrace treads
Size of areas: 10 to 30 acres

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown, friable silt loam

Subsoil:
10 to 27 inches—brown and yellowish brown, mottled, friable silt loam
27 to 50 inches—yellowish brown, mottled, friable silty clay loam and silt loam

Substratum:
50 to 70 inches—dark yellowish brown, mottled, friable loam
70 to 80 inches—yellowish brown, mottled, friable stratified silt loam, loam, and silty clay loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1.0 to 2.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately slow
Available water capacity: High
Surface runoff: Slow

Composition

Fitchville soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Caneadea soils, which have more clay throughout and are in landscape positions similar to those of the Fitchville soil
• Poorly drained soils in depressions
Similar inclusions:
• Soils that have a higher content of sand and coarse fragments in the surface layer and subsoil

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited if drained
Major management concerns: Wetness, crusting, tilth
Management measures:
• Installing a subsurface drainage system helps to overcome the wetness in the subsoil.
• Grassed waterways and open ditches help to overcome the wetness by moving runoff from the adjacent uplands to natural drainageways or ditches.
• Tilling within the proper range of moisture content helps to prevent crusting.
• Cover crops and a system of conservation tillage that leaves crop residue on the surface help to improve tilth, increase the rate of water infiltration, and prevent surface crusting.

Pasture

Suitability: Well suited if drained
Major management concerns: Compaction in overgrazed areas
Management measures:
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Logging should be done when the soil is frozen or during the drier parts of the year.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—wetness
Management measures:
• Building sites should be landscaped so that excess water drains away from foundations.
• Waterproofing basement walls, installing drains at the base of footings, and installing sump pumps help to keep basements dry.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Wetness, moderately slow permeability
Management measures:
• Installing perimeter drains around the absorption field helps to overcome the wetness if drainage outlets are available.
• Enlarging the absorption field system helps to overcome the moderately slow permeability.
• An aeration septic tank absorption field that has a suitable outlet is an effective alternative system.

Camp areas

Suitability: Poorly suited
Major management concerns: Wetness
Management measures:
• A drainage system is needed.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• A drainage system is needed.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Pasture and hayland suitability group: C-1

FcB—Fitchville silt loam, 2 to 6 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Terrace treads
Size of areas: 5 to 30 acres

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown, friable silt loam

Subsoil:
10 to 55 inches—brown and yellowish brown, mottled, friable silty clay loam and silt loam

Substratum:
55 to 80 inches—brown, mottled, friable silty clay loam and silt loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1.0 to 2.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately slow
Available water capacity: High
Surface runoff: Medium

Composition

Fitchville soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Caneadea soils, which have more clay throughout and are in landscape positions similar to those of the Fitchville soil
• The moderately well drained Glenford soils on the more sloping parts of the landscape
• Poorly drained soils in narrow drainageways
Similar inclusions:
• Soils that have a higher content of sand and coarse fragments in the surface layer and subsoil

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited if drained
Major management concerns: Wetness, erosion, tilth, organic matter content, crusting
Management measures:
• Installing a subsurface drainage system helps to overcome the wetness in the subsoil.
• Conservation tillage, contour farming, stripcropping, grassed waterways, and cover crops help to control erosion and to maintain tilth and organic matter content.
• Tilling within the proper range of moisture content helps to prevent crusting.

Pasture

Suitability: Well suited if drained
Major management concerns: Erosion and compaction in overgrazed or plowed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface,

including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Logging should be done when the soil is frozen or during the drier parts of the year.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—wetness
Management measures:
• Building sites should be landscaped so that excess water drains away from foundations.
• Waterproofing basement walls, installing drains at the base of footings, and installing sump pumps help to keep basements dry.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Installing perimeter drains around the absorption field helps to overcome the wetness if drainage outlets are available.
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the moderately slow permeability.
• An aeration septic tank absorption field that has a suitable outlet is an effective alternative system.

Camp areas

Suitability: Poorly suited
Major management concerns: Wetness
Management measures:
• A drainage system is needed.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• A drainage system is needed.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: C-1

GeC—Germano fine sandy loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 3 to 10 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable fine sandy loam

Subsoil:
10 to 26 inches—yellowish brown, friable fine sandy loam and channery fine sandy loam

Substratum:
26 to 33 inches—yellowish brown, friable very channery fine sandy loam

Bedrock:
33 to 37 inches—fractured, weathered sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderately rapid
Available water capacity: Low
Surface runoff: Medium or rapid

Composition

Germano soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small areas of Dekalb soils, which have a higher

content of rock fragments in the subsoil and are in landscape positions similar to those of the Germano soil
• Small areas of Gilpin soils, which have more silt and clay in the subsoil and are in landscape positions similar to those of the Germano soil
Similar inclusions:
• Soils that have a surface layer of loam

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, prevent excessive soil loss, conserve moisture, and maintain tilth.
• Smaller, more timely applications of lime and fertilizer minimize the loss of nutrients by leaching.
• Because of the limited available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Well suited
Major management concerns: Erosion, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.

Woodland

Suitability: Well suited
Major management concerns: Windthrow hazard, plant competition, limitations for log landings
Management measures:
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Management measures:
• The bedrock generally can be ripped with construction equipment.
• Buildings should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Thin layer, seepage

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Well suited
Major management concerns: None

Local roads and streets

Suitability: Well suited
Major management concerns: Slope
Management measures:
• Building roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4D
Pasture and hayland suitability group: F-1

GeD—Germano fine sandy loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable fine sandy loam

Subsoil:
9 to 16 inches—dark yellowish brown, friable fine sandy loam
16 to 24 inches—dark brown, friable channery sandy loam

Substratum:
24 to 32 inches—dark brown, very friable very channery sandy loam

Bedrock:
32 to 49 inches—layered, weathered sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderately rapid
Available water capacity: Low
Surface runoff: Rapid

Composition

Germano soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small areas of Dekalb soils, which have a higher content of rock fragments in the subsoil and are in landscape positions similar to those of the Germano soil
• Small areas of Gilpin soils, which have more silt and clay in the subsoil and are in landscape positions similar to those of the Germano soil
Similar inclusions:
• Soils that have a surface layer of loam

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, prevent excessive soil loss, and conserve moisture.
• Smaller, more timely applications of lime and fertilizer minimize the loss of nutrients by leaching.
• Because of the limited available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; windthrow hazard; plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• The bedrock generally can be ripped with construction equipment.
• Local roads and streets should be built on the contour.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, thin layer, seepage

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Building roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: F-1

GnB—Gilpin silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 35 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 25 inches—yellowish brown, firm silty clay loam

Substratum:
25 to 30 inches—yellowish brown and strong brown, firm channery silty clay loam

Bedrock:
30 to 35 inches—shale

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate
Available water capacity: Low
Surface runoff: Medium

Composition

Gilpin soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small intermingled areas of the deep, moderately well drained Coshocton soils
• Berks soils, which have more shale fragments in the subsoil and are near slope breaks and in narrow areas on ridgetops
Similar inclusions:
• Soils that have a surface layer of loam
• Soils that are deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited
Major management concerns: Erosion, droughtiness, tilth, organic matter content, crusting
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour farming, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Grassed waterways and a cropping sequence that includes grasses and legumes also help to control erosion.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• Because of the low available water capacity, this soil is best suited to crops that mature early in the growing season.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Well suited
Major management concerns: Dwellings with basements—depth to bedrock; dwellings without basements—none
Management measures:
• The bedrock generally can be ripped with construction equipment.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Depth to bedrock

Camp areas

Suitability: Well suited

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Well suited
Major management concerns: Frost action
Management measures:
• Providing suitable base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: F-1

GnC—Gilpin silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 80 acres

Typical Profile

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 6 inches—very dark grayish brown and brown, friable silt loam

Subsoil:
6 to 30 inches—yellowish brown, friable silt loam, silty clay loam, channery silty clay loam, and very channery silt loam

Bedrock:
30 to 35 inches—shale

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate
Available water capacity: Low
Surface runoff: Rapid

Composition

Gilpin soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The deep, moderately well drained Coshocton soils in small, concave areas
• Berks soils, which have more shale fragments in the subsoil and are near slope breaks
• Dekalb soils, which have more sandstone fragments in the subsoil and are in the more convex areas and near slope breaks
Similar inclusions:
• Soils that have a surface layer of loam
• Soils that are deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Erosion, droughtiness, tilth, organic matter content, crusting
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content (fig. 5).
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• No-till planting minimizes crusting.
• Grassed waterways and a cropping sequence that includes grasses and legumes help to control erosion.

Figure 5.—No-till corn in an area of Gilpin silt loam, 6 to 15 percent slopes.

• Because of the low available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Well suited
Major management concerns: Erosion
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Management measures:
• The bedrock generally can be ripped with construction equipment.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Depth to bedrock

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Well suited
Major management concerns: Slope, frost action
Management measures:
• Building local roads and streets on the contour and seeding roadcuts help to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: F-1

GnD—Gilpin silt loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 5 to 60 acres

Typical Profile

Surface layer:
0 to 5 inches—brown, friable silt loam

Subsoil:
5 to 25 inches—brown and yellowish brown, friable silt loam, silty clay loam, and channery silt loam

Bedrock:
25 to 28 inches—shale

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Moderately deep
Root zone: Moderately deep
Permeability: Moderate
Available water capacity: Low
Surface runoff: Rapid

Composition

Gilpin soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small areas of Berks soils, which have more shale fragments in the subsoil and are near slope breaks
• The deep, moderately well drained Guernsey soils, which have more clay in the subsoil and are in small, seepy areas
• Dekalb soils, which have more sandstone fragments in the subsoil and are near slope breaks
Similar inclusions:
• Soils that have a surface layer of loam or channery loam
• Soils that are deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to grasses and legumes for hay
Major management concerns: Erosion, droughtiness, tilth, organic matter content, crusting
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to conserve moisture, reduce the runoff rate, control erosion, and maintain tilth and organic matter content.
• A permanent plant cover is the best means of controlling erosion.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• No-till planting minimizes crusting.
• Because of the low available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in overgrazed or plowed areas

Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; erosion; seedling mortality on south aspects; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Special equipment is needed for site preparation and planting because of the slope.
• Cutting and filling to a more desirable slope improve sites for log landings.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Bedrock is within a depth of 20 inches in some areas, but it generally can be ripped with construction equipment.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Depth to bedrock, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: F-1

GoC—Gilpin-Coshocton complex, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Distinctive landscape features: Seeps and springs
Size of areas: 10 to 100 acres

Typical Profile

Gilpin

Surface layer:
0 to 8 inches—brown, friable silt loam

Subsoil:
8 to 27 inches—yellowish brown, friable silt loam
27 to 33 inches—yellowish brown, firm channery silt loam

Bedrock:
33 to 39 inches—shale

Coshocton

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 15 inches—yellowish brown, friable silt loam
15 to 45 inches—yellowish brown, mottled, firm silty clay loam and channery silty clay loam

Bedrock:
45 to 49 inches—fractured shale

Soil Properties and Qualities

Drainage class: Gilpin—well drained; Coshocton—moderately well drained

Seasonal high water table: Gilpin—at a depth of more than 6 feet; Coshocton—1.5 to 3.0 feet
Depth class: Gilpin—moderately deep; Coshocton—deep or very deep
Root zone: Gilpin—moderately deep; Coshocton—deep or very deep
Permeability: Gilpin—moderate; Coshocton—moderately slow or slow
Available water capacity: Gilpin—low; Coshocton—moderate
Surface runoff: Medium or rapid

Composition

Gilpin soil and similar soils: 55 percent
Coshocton soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Intermingled areas of the well drained, moderately deep Berks soils, which have more shale fragments in the subsoil and are near slope breaks
• Small, scattered areas of the moderately well drained, deep Guernsey soils, which have more clay in the subsoil
Similar inclusions:
• Well drained soils that are deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Erosion, tilth, organic matter content, droughtiness, wetness, crusting
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, maintain tilth and organic matter content, and conserve moisture.
• Installing subsurface drains helps to overcome the wetness in seepy areas.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• No-till planting minimizes crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion in overgrazed or plowed areas, compaction
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Restricting grazing during wet periods minimizes compaction of the Coshocton soil.

Woodland

Suitability: Well suited
Major management concerns: Gilpin—plant competition, limitations for log landings; Coshocton—plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Coshocton soil.

Buildings

Suitability: Moderately well suited
Major management concerns in areas of the Gilpin soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Major management concerns in areas of the Coshocton soil: Dwellings with basements—wetness, slope; dwellings without basements—wetness, shrink-swell potential, slope
Management measures:
• Bedrock is within a depth of 20 inches in some areas of the Gilpin soil, but it generally can be ripped with construction equipment.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry in areas of the Coshocton soil.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Coshocton soil.

Septic tank absorption fields

Suitability: Gilpin—generally unsuited; Coshocton—poorly suited
Major management concerns: Gilpin—depth to bedrock; Coshocton—wetness, restricted permeability
Management measures:
• Installing curtain drains, enlarging the absorption

field, and installing an alternating absorption field system improve the effectiveness of the absorption fields in areas of the Coshocton soil.
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.

Camp areas

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Coshocton—slope, wetness
Management measures:
• Grading the soil so that it has a more desirable slope and installing a drainage system help to overcome the limitations of the Coshocton soil.

Paths and trails

Suitability: Well suited
Major management concerns: Gilpin—none; Coshocton—erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Coshocton soil.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Gilpin—slope, frost action; Coshocton—low strength, frost action
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: Gilpin—F-1; Coshocton—A-6

GoD—Gilpin-Coshocton complex, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Distinctive landscape features: Seeps, springs, and a few landslips
Size of areas: 10 to 100 acres

Typical Profile

Gilpin

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsoil:
6 to 30 inches—yellowish brown, firm silty clay loam and channery silty clay loam

Substratum:
30 to 36 inches—yellowish brown, firm very channery silty clay loam

Bedrock:
36 to 38 inches—shale

Coshocton

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 20 inches—yellowish brown, friable silt loam
20 to 44 inches—yellowish brown, mottled, firm silty clay loam and channery silty clay

Substratum:
44 to 64 inches—yellowish brown and dark yellowish brown, mottled, firm channery silty clay

Bedrock:
64 to 66 inches—shale

Soil Properties and Qualities

Drainage class: Gilpin—well drained; Coshocton—moderately well drained
Seasonal high water table: Gilpin—at a depth of more than 6 feet; Coshocton—1.5 to 3.0 feet
Depth class: Gilpin—moderately deep; Coshocton—deep or very deep
Root zone: Gilpin—moderately deep; Coshocton—deep or very deep
Permeability: Gilpin—moderate; Coshocton—moderately slow or slow
Available water capacity: Gilpin—low; Coshocton—moderate
Surface runoff: Rapid

Composition

Gilpin soil and similar soils: 55 percent
Coshocton soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Intermingled areas of the well drained, moderately

deep Berks soils, which have more shale fragments in the subsoil and are near slope breaks
• Small, scattered areas of the moderately well drained Guernsey soils, which have more clay in the subsoil and are susceptible to slippage
Similar inclusions:
• Soils that are deep to bedrock and are well drained

Use and Management

Land Use: Dominant uses—pasture and cropland; other uses—woodland

Cropland

Suitability: Poorly suited to row crops and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content, droughtiness, wetness, crusting
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Installing subsurface drains helps to overcome the wetness in seepy areas.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• No-till planting minimizes crusting.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in overgrazed or plowed areas, compaction
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Restricting grazing during wet periods minimizes compaction of the Coshocton soil.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Coshocton soil.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate on south aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns in areas of the Gilpin soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Major management concerns in areas of the Coshocton soil: Dwellings with basements—wetness, slope; dwellings without basements—slope
Management measures:
• The bedrock generally can be ripped with construction equipment.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Installing a drainage system in seepy areas of the included Guernsey soils reduces the hazard of slippage.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry in areas of the Coshocton soil.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Coshocton soil.

Septic tank absorption fields

Suitability: Gilpin—generally unsuited; Coshocton—poorly suited
Major management concerns: Gilpin—depth to bedrock, slope; Coshocton—wetness, restricted permeability, slope
Management measures:
• Installing curtain drains, enlarging the absorption area, and installing an alternating absorption field system improve the effectiveness of the absorption fields in areas of the Coshocton soil.

• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Coshocton—erosion
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Coshocton—low strength, slope, frost action
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: Gilpin—4R; Coshocton—4R on north aspects, 3R on south aspects
Pasture and hayland suitability group: Gilpin—F-1; Coshocton—A-2

GpC—Gilpin-Lowell complex, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 10 to 100 acres

Typical Profile

Gilpin

Surface layer:
0 to 6 inches—dark grayish brown, friable silt loam

Subsoil:
6 to 26 inches—dark yellowish brown and yellowish brown, friable and firm silt loam, silty clay loam, and channery silty clay loam

Bedrock:
26 to 28 inches—siltstone

Lowell

Surface layer:
0 to 6 inches—brown, friable silt loam

Subsoil:
6 to 10 inches—dark yellowish brown, friable silt loam
10 to 30 inches—yellowish brown, firm silty clay loam and silty clay
30 to 50 inches—yellowish brown, firm silty clay; mottled in the lower part

Substratum:
50 to 65 inches—brown, mottled, firm silty clay

Bedrock:
65 to 67 inches—siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Gilpin—moderately deep; Lowell—deep or very deep
Root zone: Gilpin—moderately deep; Lowell—deep or very deep
Permeability: Gilpin—moderate; Lowell—moderately slow
Available water capacity: Gilpin—low; Lowell—moderate
Surface runoff: Gilpin—medium or rapid; Lowell—rapid

Composition

Gilpin soil and similar soils: 55 percent
Lowell soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Berks soils, which have more shale fragments in the subsoil and are near slope breaks and at the crest of knolls and narrow ridgetops
Similar inclusions:
• Medium textured soils that are deep to bedrock
• Soils that are wetter
• Soils that have a surface layer of silty clay loam

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content, droughtiness, crusting
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, maintain tilth and organic matter content, and conserve moisture in the Gilpin soil.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting, compaction, and the formation of clods.
• No-till planting minimizes crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion in overgrazed or plowed areas, compaction
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Restricting grazing during wet periods minimizes compaction, especially in areas where the surface layer is silty clay loam.

Woodland

Suitability: Well suited
Major management concerns: Gilpin—plant competition, limitations for log landings; Lowell—plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Lowell soil.

Buildings

Suitability: Moderately well suited
Major management concerns in areas of the Gilpin soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope
Major management concerns in areas of the Lowell soil: Dwellings with basements—depth to bedrock, slope, shrink-swell potential; dwellings without basements—shrink-swell potential, slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Lowell soil.
• Bedrock is within a depth of 20 inches in some areas of the Gilpin soil, but it generally can be ripped with construction equipment.

Septic tank absorption fields

Suitability: Gilpin—generally suited; Lowell—poorly suited
Major management concerns: Gilpin—depth to bedrock; Lowell—restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent in areas of the Lowell soil.

Camp areas

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Lowell—slope, restricted permeability
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the slope.

Paths and trails

Suitability: Well suited
Major management concerns: Gilpin—none; Lowell—erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Lowell soil.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Gilpin—slope, frost action; Lowell—slope, low strength
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

• Providing suitable base material helps to prevent the damage caused by the low strength of the Lowell soil and by frost action in the Gilpin soil.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: Gilpin—4A; Lowell—5A
Pasture and hayland suitability group: Gilpin—F-1; Lowell—A-1

GpD—Gilpin-Lowell complex, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Distinctive landscape features: Lowell—landslips on hillsides
Size of areas: 10 to 100 acres

Typical Profile

Gilpin

Surface layer:
0 to 4 inches—dark grayish brown, friable silt loam

Subsoil:
4 to 21 inches—yellowish brown, friable silt loam and channery silt loam

Substratum:
21 to 24 inches—brown, firm very channery silt loam

Bedrock:
24 to 26 inches—siltstone

Lowell

Surface layer:
0 to 4 inches—brown and yellowish brown, friable silt loam

Subsoil:
4 to 8 inches—yellowish brown, friable silty clay loam
8 to 55 inches—yellowish brown and light olive brown, firm silty clay; mottled in the lower part

Substratum:
55 to 60 inches—light olive brown, mottled, firm silty clay

Bedrock:
60 to 62 inches—siltstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Gilpin—moderately deep; Lowell—deep or very deep
Root zone: Gilpin—moderately deep; Lowell—deep or very deep
Permeability: Gilpin—moderate; Lowell—moderately slow
Available water capacity: Gilpin—low; Lowell—high
Surface runoff: Rapid

Composition

Gilpin soil and similar soils: 55 percent
Lowell soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Berks soils, which have more shale fragments in the subsoil and are near the upper part of slopes
Similar inclusions:
• Medium textured soils that are deep to bedrock
• Soils that are wetter
• Soils that have a surface layer of silty clay loam

Use and Management

Land Use: Dominant uses—pasture and woodland; other uses—cropland

Cropland

Suitability: Poorly suited to corn and small grain; moderately suited to hay
Major management concerns: Erosion, tilth, organic matter content, droughtiness, crusting
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, maintain tilth and organic matter content, and conserve moisture in the Gilpin soil.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting, compaction, and the formation of clods.
• No-till planting minimizes crusting.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or

overgrazed areas, compaction
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Restricting grazing during wet periods minimizes compaction, especially in the areas of included soils that have a surface layer of silty clay loam.

Woodland

Suitability: Well suited
Major management concerns: Gilpin—erosion, seedling mortality on south aspects, plant competition, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Lowell—erosion, plant competition, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on south aspects of the Gilpin soil.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength in areas of the Lowell soil.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Log landings and haul roads should not be built on active landslips in areas of the Lowell soil.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns in areas of the Gilpin soil: Dwellings with and without basements—slope
Major management concerns in areas of the Lowell soil: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Active landslips should not be selected as building sites.
• Bedrock is within a depth of 20 inches in some areas, but it generally can be ripped with construction equipment.
• Cutting and filling increase the hazard of slippage on hillsides in areas of the Lowell soil. Installing a drainage system in areas where water collects reduces the hazard.
• Designing walls that have pilasters and that are reinforced with concrete, supporting walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling of the Lowell soil.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Gilpin—depth to bedrock, slope; Lowell—restricted permeability, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Lowell—erosion
Management measures:
• Establishing paths and trails on the contour in areas of the Gilpin soil reduces the angle of incline.
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion on the Lowell soil.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Gilpin—slope; Lowell—low strength, slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by low strength of the Lowell soil.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: Gilpin—4R; Lowell—5R
Pasture and hayland suitability group: Gilpin—F-1; Lowell—A-2

GsB—Glenford silt loam, 2 to 6 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Terrace treads
Size of areas: 5 to 50 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 45 inches—yellowish brown, friable and firm silt loam and silty clay loam; mottled in the lower part
45 to 57 inches—yellowish brown, mottled, friable silt loam

Substratum:
57 to 80 inches—brown, mottled, friable silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 2.0 to 3.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately slow
Available water capacity: Moderate or high
Surface runoff: Medium

Composition

Glenford soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fitchville soils in depressions

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• Conservation tillage, contour farming, grassed waterways, and cover crops help to control erosion and to maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness; dwellings without basements—wetness, shrink-swell potential
Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.
• Installing perimeter drains helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Installing a drainage system and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• Adding sand or gravel to create a solid base helps to overcome the wetness.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-6

GsC—Glenford silt loam, 6 to 15 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Terrace treads
Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 8 inches—brown, friable silt loam

Subsoil:
8 to 48 inches—yellowish brown, friable silt loam and silty clay loam; mottled in the lower part

Substratum:
48 to 80 inches—brown, mottled, friable silt loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 2.0 to 3.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately slow
Available water capacity: Moderate or high
Surface runoff: Medium or rapid

Composition

Glenford soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The somewhat poorly drained Fitchville soils in depressions

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Leaving crop residue on the surface and tilling within the proper range of moisture content help to prevent crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in overgrazed or plowed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings

Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness; dwellings without basements—wetness, shrink-swell potential, slope
Management measures:
• Backfilling around foundations with material that has a low shrink-swell potential helps to prevent the structural damage caused by shrinking and swelling.
• Buildings should be designed so that they conform to the natural slope of the land.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.
• Installing perimeter drains helps to reduce wetness.
• Installing the distribution lines on the contour helps to prevent seepage of the effluent to the surface.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, wetness, restricted permeability
Management measures:
• Installing a drainage system, grading the soil so that it has a more desirable slope, and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour, establishing water bars, and building steps help to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-6

GtC—Guernsey silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Benches and side slopes
Size of areas: 5 to 40 acres

Typical Profile

Surface layer:
0 to 8 inches—brown, friable silt loam

Subsoil:
8 to 15 inches—yellowish brown, friable silty clay loam
15 to 45 inches—brown and light olive brown, mottled, firm silty clay

Substratum:
45 to 64 inches—olive brown, mottled, firm silty clay loam

Bedrock:
64 to 66 inches—interbedded limestone and calcareous shale

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Slow or moderately slow
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: High

Composition

Guernsey soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The well drained, moderately deep Berks and Gilpin soils, which contain less clay in the subsoil and are on the higher parts of slopes

• Coshocton soils, which contain less clay in the subsoil and are near slope breaks
• A few seepy areas on the lower part of slopes and on benches
Similar inclusions:
• Soils that have a surface layer of silty clay loam
• Well drained soils that have carbonates at shallower depths

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth and the content of organic matter, reduce the runoff rate, and prevent excessive soil loss.
• Tilling within the proper range of moisture content helps to prevent compaction and crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness, shrink-swell potential; dwellings without basements—shrink-swell potential
Management measures:
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.
• Installing perimeter drains helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, wetness, restricted permeability
Management measures:
• Grading the soil so that it has a more desirable slope, installing a drainage system, and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Shrink-swell potential, low strength, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.
• Building local roads and streets on the contour and seeding roadcuts help to control erosion.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-6

GuD2—Guernsey silty clay loam, 15 to 25 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Side slopes
Distinctive landscape features: Seeps, springs, and landslips
Size of areas: 5 to 200 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silty clay loam

Subsoil:
9 to 15 inches—yellowish brown, firm silty clay
15 to 40 inches—yellowish brown and light olive brown, mottled, firm silty clay and clay

Substratum:
40 to 80 inches—light yellowish brown, strong brown, and brown, mottled, firm silty clay and silty clay loam

Bedrock:
80 to 83 inches—brown, soft shale

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Slow or moderately slow
Available water capacity: Moderate
Surface runoff: Very rapid
Shrink-swell potential: High

Composition

Guernsey soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- The well drained Berks and Gilpin soils, which contain less clay in the subsoil and are in small convex areas
- Small intermingled areas of the well drained Upshur soils

Similar inclusions:
- Soils that have a surface layer of silt loam

Use and Management

Land Use: Dominant uses—pasture and cropland; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
- A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth and organic matter content, reduce the runoff rate, and prevent excessive soil loss.
- Tilling within the proper range of moisture content helps to prevent compaction and clodding.
- Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas, compaction
Management measures:
- Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
- Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality rate on south aspects; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
- Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
- Water bars and a vegetative cover also help to control erosion.
- Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south aspects.
- Removing vines and the less desirable trees and shrubs helps to control plant competition.

• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—slope, slippage, shrink-swell potential
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land.
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Cutting and filling increase the hazard of slippage on hillsides, but installing a drainage system in seepy areas reduces the hazard.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Wetness, restricted permeability, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Shrink-swell potential, low strength, slope, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: A-2

GuE2—Guernsey silty clay loam, 25 to 40 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Side slopes
Distinctive landscape features: Landslips, springs, and seeps
Size of areas: 10 to 100 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silty clay loam

Subsoil:
7 to 13 inches—brown, firm silty clay loam
13 to 40 inches—brown, mottled, firm silty clay and channery silty clay

Substratum:
40 to 80 inches—dark brown, light olive brown, and grayish brown, firm silty clay

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Slow or moderately slow
Available water capacity: Moderate
Surface runoff: Very rapid
Shrink-swell potential: High

Composition

Guernsey soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The well drained, moderately deep Gilpin soils,

which have less clay in the subsoil and are near slope breaks
• Small intermingled areas of the well drained Upshur soils, which are redder in the subsoil

Use and Management

Land Use: Dominant uses—pasture and woodland; other uses—hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, slope
Management measures:
• No-till seeding and a permanent plant cover help to control erosion.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, slope
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Special equipment is needed because of the slope.

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—slope, slippage, shrink-swell potential

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Wetness, restricted permeability, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope, erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Shrink-swell potential, low strength, slope, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: A-3

HeD—Hazleton channery sandy loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable channery sandy loam

Subsoil:
7 to 30 inches—yellowish brown, friable channery loam and very channery sandy loam

Substratum:
30 to 42 inches—dark yellowish brown, friable extremely channery sandy loam

Bedrock:
42 to 44 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Rapid or moderately rapid
Available water capacity: Low
Surface runoff: Rapid

Composition

Hazleton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep Gilpin soils, which have a higher content of clay and a lower content of coarse fragments in the subsoil and are on the less sloping parts of the landscape
Similar inclusions:
• Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness, tilth, organic matter content
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, conserve moisture, control erosion, and maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Because of the low available water capacity, this soil is better suited to crops that mature early in the growing season.
• Timely applications of lime and fertilizer are needed because of rapid leaching.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality on south aspects; plant competition on north aspects; equipment limitations for haul roads, log landings, skid tails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on north aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Poor filter, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Slope

Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Building local roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: B-1

HeE—Hazleton channery sandy loam, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 10 to 40 acres

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown, friable channery sandy loam

Subsoil:
4 to 45 inches—dark yellowish brown and yellowish brown, friable channery and very channery loam

Substratum:
45 to 65 inches—yellowish brown, friable extremely channery loam and extremely channery sandy loam

Bedrock:
65 to 67 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Rapid or moderately rapid
Available water capacity: Low
Surface runoff: Very rapid

Composition

Hazleton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small, scattered areas of Westmoreland and Rigley soils, which have a lower content of sandstone fragments in the subsoil
Similar inclusions:
• Soils that have bedrock at a depth of 20 to 40 inches

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, slope, droughtiness
Management measures:
• A permanent plant cover is the best means of controlling erosion and overcoming droughtiness.
• No-till seeding also helps to control erosion.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion, slope
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Seedling mortality on south aspects; plant competition on north aspects; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on north aspects.

• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Poor filter, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Building roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: B-2

HeF—Hazleton channery sandy loam, 40 to 70 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 10 to 200 acres

Typical Profile

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 3 inches—very dark grayish brown, friable channery sandy loam

Subsoil:
3 to 34 inches—yellowish brown, friable channery sandy loam and very channery sandy loam

Substratum:
34 to 66 inches—yellowish brown, very friable extremely channery loamy sand

Bedrock:
66 to 68 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Rapid or moderately rapid
Available water capacity: Low
Surface runoff: Very rapid

Composition

Hazleton soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small, scattered areas of Westmoreland and Rigley soils, which have a lower content of sandstone fragments in the subsoil
Similar inclusions:
• Soils that have bedrock at a depth of 20 to 40 inches

Use and Management

Land Use: Dominant uses—woodland

Cropland

Suitability: Generally unsuited

Pasture

Suitability: Generally unsuited

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition on north aspects; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trials on the contour

facilitates the use of equipment and helps to control erosion.
• Water bars and vegetative cover also help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on north aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Poor filter, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Building local roads and streets on the contour reduces the angle of incline.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: H-1

KeB—Keene silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and benches
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 30 inches—yellowish brown, friable silt loam; mottled in the lower part
30 to 50 inches—yellowish brown and dark grayish brown, mottled, firm silty clay loam and silty clay

Substratum:
50 to 80 inches—dark yellowish brown and yellowish brown, mottled, firm silty clay

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 1.5 to 3.0 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Slow or moderately slow
Available water capacity: High
Surface runoff: Medium

Composition

Keene soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Aaron soils, which have more clay in the subsoil and are in landscape positions similar to those of the Keene soil
• The moderately deep, well drained Gilpin soils near slope breaks
Similar inclusions:
• Soils that have a thicker layer of silt loam

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, tilth, organic matter content, frost heaving
Management measures:
• Conservation tillage, contour farming, and cover crops help to control erosion and to maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Tilling within the proper range of moisture content helps to prevent excessive compaction and crusting.

• Installing subsurface drains helps to overcome the wetness in seepy areas.
• Legume-grass mixtures are less likely to be damaged by frost heaving than pure stands of alfalfa.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, equipment limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness; dwellings without basements—wetness, shrink-swell potential
Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Installing perimeter drains, enlarging the absorption area, and installing an alternating absorption field system improve the effectiveness of the absorption fields.

Camp areas

Suitability: Moderately well suited
Major management concerns: Wetness, restricted permeability
Management measures:
• Installing a drainage system and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Well suited
Major management concerns: None

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-6

LnC—Lowell silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 3 to 20 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 44 inches—yellowish brown, firm silty clay loam and silty clay; mottled in the lower part

Substratum:
44 to 52 inches—yellowish brown, mottled, firm silty clay

Bedrock:
52 to 54 inches—hard limestone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet

Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderately slow
Available water capacity: Moderate
Surface runoff: Medium or rapid

Composition

Lowell soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep Berks soils near slope breaks
• The deep Westmoreland soils, which have less clay in the subsoil and are near slope breaks
Similar inclusions:
• Soils that have a surface layer of silty clay loam
• Soils that are moderately well drained
• Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth and organic matter content, reduce the runoff rate, and prevent excessive soil loss.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Tilling within the proper range of moisture content helps to prevent excessive compaction and crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion, compaction
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, equipment limitations for haul roads and log landings
Management measures:
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—depth to bedrock, slope, shrink-swell potential; dwellings without basements—shrink-swell potential, slope
Management measures:
• Because bedrock can be within a depth of 40 inches, blasting may be necessary in the deeper excavations.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, restricted permeability
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the slope.
• Installing a large absorption field for the disposal of wastewater compensates for the moderately slow permeability of the soil.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength
Management measures:
• Providing suitable base material helps to prevent the damage caused by low strength.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-1

LoD2—Lowell silty clay loam, 15 to 25 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Distinctive landscape features: Landslips
Size of areas: 5 to 100 acres

Typical Profile

Surface layer:
0 to 6 inches—brown, friable silty clay loam

Subsoil:
6 to 10 inches—yellowish brown, friable silty clay loam
10 to 48 inches—yellowish brown, firm silty clay and clay

Substratum:
48 to 56 inches—yellowish brown, firm clay
56 to 64 inches—light yellowish brown, firm channery silty clay

Bedrock:
64 to 66 inches—hard limestone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderately slow
Available water capacity: Moderate
Surface runoff: Very rapid

Composition

Lowell soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep Berks soils near slope breaks
• Westmoreland soils, which have less clay in the subsoil and are near slope breaks
Similar inclusions:
• Soils that have a surface layer of silty clay
• Soils that are moderately well drained
• Soils that have carbonates in the subsoil

Use and Management

Land Use: Dominant uses—pasture; other uses—cropland and woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• Tilling within the proper range of moisture content helps to prevent compaction and clodding.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in overgrazed or plowed areas
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.
• Controlled grazing during wet periods minimizes compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.

• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Haul roads and log landings should not be built on active landslips.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Installing a drainage system in areas where water collects reduces the hazard of slippage on hillsides.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Because bedrock can be within a depth of 40 inches, blasting may be necessary in the deeper excavations.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing steps and switchbacks help to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by low strength.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 5R
Pasture and hayland suitability group: A-2

LoE2—Lowell silty clay loam, 25 to 40 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Side slopes
Distinctive landscape features: Landslips
Size of areas: 20 to more than 100 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silty clay loam

Subsoil:
7 to 22 inches—yellowish brown, firm silty clay
22 to 56 inches—brown and light olive brown, firm silty clay; mottled in the lower part

Bedrock:
56 to 58 inches—hard limestone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderately slow
Available water capacity: Moderate
Surface runoff: Very rapid

Composition

Lowell soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Scattered areas of the moderately deep Berks soils
• Scattered areas of Westmoreland soils, which have less clay in the subsoil
Similar inclusions:
• Soils that are moderately well drained

- Soils that have carbonates in the subsoil

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Slope, erosion
Management measures:
- A permanent plant cover is the best means of controlling erosion.
- No-till seeding helps to control erosion.
- Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Slope, erosion in plowed or overgrazed areas
Management measures:
- A permanent plant cover is the best means of controlling erosion.
- Restricting grazing during wet periods minimizes compaction.
- Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Erosion; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
- Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
- Water bars and a vegetative cover also help to control erosion.
- Applying gravel or crushed stone on haul roads and log landings improves soil strength.
- Cutting and filling to a more desirable slope improve sites for log landings.
- Haul roads and log landings should not be built on active landslips.
- Special equipment is needed for site preparation and planting because of the slope.
- Removing vines and the undesirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, restricted permeability

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope, erosion
Management measures:
- Establishing paths and trails on the contour reduces the angle of incline and the erosion hazard.
- Establishing water bars, steps, and switchbacks also helps to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, slope
Management measures:
- Providing suitable base material helps to prevent the damage caused by low strength.
- Constructing roads and streets on the contour and seeding roadcuts help to control erosion.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 5R
Pasture and hayland suitability group: A-3

Me—Melvin silt loam, ponded

Setting

Landform: Flood plains
Position on the landform: Along streams
Slope: 0 to 2 percent
Distinctive landscape features: Subject to ponding and frequent flooding
Size of areas: 20 to 50 acres

Typical Profile

Surface layer:
0 to 6 inches—gray, friable silt loam

Subsoil:
6 to 24 inches—gray, friable silt loam

Substratum:
24 to 40 inches—grayish brown, friable silt loam
40 to 50 inches—gray, mottled, friable loam

50 to 80 inches—gray, mottled, friable stratified silt loam to loamy sand

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Near or above the surface
Depth class: Deep or very deep
Root zone: Very deep but restricted by the seasonal high water table
Permeability: Moderate
Available water capacity: High
Surface runoff: Ponded

Composition

Melvin soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small areas of somewhat poorly drained soils in slightly convex areas
• Small intermittent and perennial ponds
Similar inclusions:
• Soils that have a higher content of sand and coarse fragments in the subsoil

Use and Management

Land Use: Dominant uses—wetland wildlife habitat

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Flooding, wetness

Pasture

Suitability: Generally unsuited
Major management concerns: Flooding, wetness

Woodland

Suitability: Poorly suited
Major management concerns: Seedling mortality; windthrow hazard; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Logging should be done during dry periods or when the soil is frozen.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate.
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Trees can be harvested and seedlings can be planted when the soil is not flooded.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—flooding, ponding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Flooding, ponding

Camp areas

Suitability: Generally unsuited
Major management concerns: Flooding, ponding

Paths and trails

Suitability: Generally unsuited
Major management concerns: Ponding

Local roads and streets

Suitability: Generally unsuited
Major management concerns: Low strength, ponding, flooding

Interpretive Groups

Land capability classification: Vw
Woodland ordination symbol: 5W
Pasture and hayland suitability group: C-3

MnB—Morristown silty clay loam, 0 to 8 percent slopes

Setting

Landform: Reclaimed surface mined areas in the uplands
Position on the landform: Ridgetops
Size of areas: 5 to 100 acres

Typical Profile

Surface layer:
0 to 3 inches—brown, friable silty clay loam

Substratum:
3 to 12 inches—brown, firm silty clay loam
12 to 80 inches—variegated gray, yellowish brown, and grayish brown, firm very channery silty clay loam and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained

Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Slow or medium

Composition

Morristown soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small depressions and pockets where water collects after periods of heavy rainfall
• Areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining and were covered during reclamation
Similar inclusions:
• Soils that have a surface layer of channery silty clay loam

Use and Management

Land Use: Dominant uses—grasses and legumes for hay; other uses—small grain and corn

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• A cropping sequence that includes grasses and legumes, incorporation of crop residue into the surface layer, contour stripcropping, and a system of conservation tillage that leaves crop residue on the surface help to control erosion, conserve moisture, and increase the rate of water infiltration.
• Because of the low available water capacity, this soil is better suited to crops that mature early in the growing season.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Limitations for haul roads and log landings
Management measures:
• The surface layer is sticky when wet. Applying gravel or crushed stone on haul roads and log landings improves traction.

Buildings

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Dwellings with and without basements—unstable fill
Management measures:
• This soil should be allowed to settle before it is used as a building site.
• Onsite investigation is needed to determine suitability.
• Backfilling around foundations with material that has a low shrink-swell potential and supporting walls with large spread footings help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Restricted permeability, unstable fill
Management measures:
• This soil should be allowed to settle before installing septic tank absorption fields.
• Onsite investigation is needed to determine suitability.
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.

Camp areas

Suitability: Moderately well suited
Major management concerns: Restricted permeability
Management measures:
• Installing a large absorption field for the disposal of wastewater compensates for the moderately slow permeability of the soil.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by frost action.

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: B-4

MnD—Morristown silty clay loam, 8 to 25 percent slopes

Setting

Landform: Reclaimed surface mined areas in the uplands
Position on the landform: Ridgetops, benches, and side slopes
Distinctive landscape features: Landslips
Size of areas: 5 to 200 acres

Typical Profile

Surface layer:
0 to 3 inches—brown, friable silty clay loam

Substratum:
3 to 12 inches—brown, firm silty clay loam
12 to 80 inches—firm extremely channery silty clay loam; gray in the upper part and gray and light olive brown in the lower part

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid

Composition

Morristown soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining and were covered during reclamation
Similar inclusions:
• Soils that have a surface layer of channery silty clay loam

Use and Management

Land Use: Dominant uses—hayland; other uses—pasture

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• No-till seeding of hay helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building skid trails on the contour facilitates the use of equipment.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope, unstable fill

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope, restricted permeability

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Unstable fill, slope
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.

Interpretive Groups

Land capability classification: IVs
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: B-4

MoB—Morristown channery silty clay loam, 0 to 8 percent slopes, stony

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Ridgetops
Size of areas: 15 to 200 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown, friable channery silty clay loam

Substratum:
7 to 80 inches—olive gray, dark gray, and brown, firm very channery and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Slow or medium
Distinctive soil properties: Stones 10 to 24 inches in diameter are 30 to 100 feet apart on the surface

Composition

Morristown soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small depressions and pockets where water collects after periods of heavy rainfall
• Areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining
Similar inclusions:
• Soils that have a surface layer of very channery silty clay loam
• Soils that are medium acid to neutral in the substratum

Use and Management

Land Use: Dominant uses—pasture; other uses—hayland and woodland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Droughtiness, erosion in plowed areas, tilth
Management measures:
• No-till seeding helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness

Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Plant competition; seedling mortality; limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate.
• The surface layer is sticky when wet. Applying gravel or crushed stone on haul roads and log landings improves traction.

Buildings

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Dwellings with and without basements—unstable fill
Management measures:
• This soil should be allowed to settle before it is used as a building site.
• Onsite investigation is needed to determine suitability.
• Backfilling around foundations with material that has a low shrink-swell potential and supporting walls with large spread footings help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Restricted permeability, unstable fill
Management measures:
• This soil should be allowed to settle before installing septic tank absorption fields.
• Onsite investigation is needed to determine suitability.
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.

Camp areas

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Stoniness, restricted permeability
Management measures:
• Installing a large absorption field for the disposal of wastewater compensates for the moderately slow permeability of the soil.
• The stones can be removed.

Paths and trails

Suitability: Well suited
Major management concerns: None

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by frost action.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 4X
Pasture and hayland suitability group: E-1

MoD—Morristown channery silty clay loam, 8 to 25 percent slopes, stony

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Graded ridgetops, benches, and side slopes
Distinctive landscape features: A few rills and gullies near slope breaks; landslips
Size of areas: 5 to 400 acres

Typical Profile

Surface layer:
0 to 7 inches—dark grayish brown and yellowish brown, friable channery silty clay loam

Substratum:
7 to 80 inches—dark grayish brown, light brownish gray, and yellowish brown, firm very channery and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Rapid or very rapid
Distinctive soil properties: Stones 10 to 24 inches in diameter are 30 to 100 feet apart on the surface

Composition

Morristown soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small intermittent and perennial ponds
• Small areas of steep soils on side slopes of spoil banks
• Areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining
Similar inclusions:
• Soils that have a surface layer of very channery silty clay loam
• Soils that are medium acid to neutral in the substratum

Use and Management

Land Use: Dominant uses—pasture; other uses—hay and woodland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, droughtiness, stoniness
Management measures:
• No-till seeding helps to control erosion and conserve moisture.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Controlled grazing in the winter and during wet periods helps to prevent excessive compaction.

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; plant competition; seedling mortality; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope, unstable fill

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope, stoniness, restricted permeability

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited once the soil has settled after reclamation
Major management concerns: Slope, unstable fill

Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.

Interpretive Groups

Land capability classification: VIs
Woodland ordination symbol: 4R
Pasture and hayland suitability group: E-1

MoE—Morristown channery silty clay loam, 25 to 40 percent slopes, stony

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Graded side slopes
Distinctive landscape features: Gullies and landslips
Size of areas: 25 to 40 acres

Typical Profile

Surface layer:
0 to 6 inches—yellowish brown, friable channery silty clay loam

Substratum:
6 to 80 inches—olive and gray, firm channery, very channery, and extremely channery silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid
Distinctive soil properties: Stones 10 to 24 inches in diameter are 30 to 100 feet apart on the surface

Composition

Morristown soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small areas of moderately steep soils on side slopes of spoil banks
• Areas directly below the original elevation of the coal that were never excavated but were otherwise affected during mining
Similar inclusions:
• Soils that have a surface layer of silty clay loam
• Soils that are medium acid to neutral in the substratum

Use and Management

Land Use: Dominant uses—pasture; other uses—areas that are in grasses and legumes

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Slope, stoniness, erosion, droughtiness

Pasture

Suitability: Generally unsuited
Major management concerns: Slope, stoniness, erosion, droughtiness

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; plant competition; seedling mortality; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope, unstable fill

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Slope, unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: E-2

MrF—Morristown channery silt loam, 25 to 70 percent slopes, bouldery

Setting

Landform: Unreclaimed surface mined areas in the uplands
Position on the landform: Side slopes
Distinctive landscape features: Landslips
Size of areas: 10 to 500 acres

Typical Profile

Surface layer:
0 to 5 inches—dark grayish brown, friable channery silt loam

Substratum:
5 to 80 inches—dark grayish brown, yellowish brown, brown, and gray, firm very channery silt loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Generally shallow or very shallow but varies within short distances because of differences in the density of the soil material
Permeability: Moderately slow
Available water capacity: Low
Surface runoff: Very rapid
Distinctive soil properties: Boulders 24 to 72 inches in diameter are 50 to 100 feet apart and stones 10 to 24 inches in diameter are 30 to 100 feet apart on the surface

Composition

Morristown soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small intermittent and perennial ponds
• Long, narrow highwalls of exposed bedrock as high as 80 feet
• Strongly sloping soils on spoil ridges
Similar inclusions:
• Soils that are medium acid to neutral in the substratum
• Soils that have a surface layer of very channery silty clay loam

Use and Management

Land Use: Dominant uses—woodland; other uses—areas that are in grasses and legumes

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Slope, boulders and stones, erosion, droughtiness

Pasture

Suitability: Generally unsuited
Major management concerns: Slope, boulders and stones, erosion, droughtiness

Woodland

Suitability: Moderately well suited
Major management concerns: Erosion; plant

competition; seedling mortality; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate.
• Haul roads and log landings should not be built on active landslips.
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope, unstable fill

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Restricted permeability, slope, unstable fill

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited once the soil has settled after reclamation
Major management concerns: Slope, unstable fill
Management measures:
• This soil should be allowed to settle before building roads and streets.
• Onsite investigation is needed to determine suitability.
• Building local roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.
• Cutting and filling increase the hazard of slippage, but installing a drainage system in areas where water concentrates reduces the hazard.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: H-1

No—Nolin silt loam, occasionally flooded

Setting

Landform: Flood plains
Position on the landform: Flats along streams
Slope: 0 to 2 percent
Size of areas: 20 to 200 acres

Typical Profile

Surface layer:
0 to 11 inches—dark grayish brown, friable silt loam

Subsoil:
11 to 40 inches—dark yellowish brown, friable silt loam and loam
40 to 50 inches—dark yellowish brown, mottled, friable loam

Substratum:
50 to 80 inches—dark yellowish brown, mottled, friable silt loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: 3 to 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate
Available water capacity: High
Surface runoff: Slow

Composition

Nolin soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Richland soils, which are gravelly in the subsoil and are in the higher positions on alluvial fans
• Melvin soils in oxbows or old channels
Similar inclusions:
• Soils that have more sand in the subsoil and substratum
• Soils that have mottles in the middle part of the subsoil
• Soils that are more acid

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Flooding, crusting
Management measures:
• This soil is better suited to crops that can be planted after the normal period of flooding than to crops planted early in spring.
• Floodwater sometimes leaves sediment on hayland making forage plants unsuitable for hay.
• Applying a system of conservation tillage that leaves crop residue on the surface and tilling within the proper range of moisture content help to prevent crusting.

Pasture

Suitability: Well suited
Major management concerns: Compaction
Management measures:
• Pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, equipment limitations for haul roads and log landings
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—flooding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Flooding, wetness

Camp areas

Suitability: Generally unsuited
Major management concerns: Flooding

Paths and trails

Suitability: Well suited
Major management concerns: None

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, flooding
Management measures:
• Building local roads and streets on suitable fill material above the expected high flood levels helps to prevent the damage caused by low strength and flooding.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-5

Np—Nolin silt loam, frequently flooded

Setting

Landform: Flood plains
Position on the landform: Flats along streams
Slope: 0 to 2 percent
Size of area: 20 to 120 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 45 inches—yellowish brown, friable silt loam and silty clay loam

Substratum:
45 to 80 inches—brown, mottled, friable silt loam and silty clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: 3 to 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate
Available water capacity: High
Surface runoff: Slow

Composition

Nolin soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Richland soils, which are gravelly in the subsoil and are in the higher positions on alluvial fans
• Melvin soils in oxbows and old channels

Similar inclusions:
• Soils that have more sand in the subsoil and substratum
• Soils that have mottles in the middle part of the subsoil

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Flooding, crusting
Management measures:
• This soil is better suited to crops that can be planted after the normal period of flooding than to crops planted early in spring.
• Floodwater sometimes leaves sediment on hayland making forage plants unsuitable for hay.
• Applying a system of conservation tillage that leaves crop residue on the surface and tilling within the proper range of moisture content help to prevent crusting.

Pasture

Suitability: Well suited
Major management concerns: Compaction
Management measures:
• Pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; seedling mortality; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Trees can be harvested and seedlings can be planted when the soil is not flooded.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—flooding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Flooding, wetness

Camp areas

Suitability: Generally unsuited
Major management concerns: Flooding

Paths and trails

Suitability: Moderately well suited
Major management concerns: Flooding
Management measures:
• Constructing paths and trails on fill material above the expected high flood levels helps to prevent the damage caused by flooding.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, flooding
Management measures:
• Constructing local roads and streets on fill material above the expected high flood levels helps to prevent the damage caused by low strength and flooding.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-5

OmB—Omulga silt loam, 2 to 6 percent slopes

Setting

Landform: Terraces and valley fills
Position on the landform: Benches along streams
Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsoil:
9 to 36 inches—yellowish brown, friable silt loam; mottled in the lower part
36 to 55 inches—a fragipan of yellowish brown, mottled, very firm and brittle silty clay loam
55 to 65 inches—yellowish brown, mottled, friable silty clay loam

Substratum:
65 to 80 inches—yellowish brown, mottled, friable silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well drained
Seasonal high water table: 2.0 to 3.5 feet

Depth class: Very deep
Root zone: Moderately deep
Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Surface runoff: Medium

Composition

Omulga soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils in seeps and slight depressions
Similar inclusions:
• Soils that have a higher content of sand and coarse fragments in the surface layer and subsoil

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, tilth, organic matter content, wetness in seepy areas
Management measures:
• Conservation tillage, contour farming, stripcropping, grassed waterways, and cover crops help to control erosion and to maintain tilth and organic matter content.
• A cropping sequence that includes grasses and legumes also helps to control erosion.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion and compaction in overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Windthrow hazard; plant competition; limitations for haul roads and log landings
Management measures:
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—seasonal wetness; dwellings without basements—seasonal wetness, shrink-swell potential
Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Seasonal wetness, slow permeability in the fragipan
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.
• Installing perimeter drains helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Seasonal wetness, restricted permeability
Management measures:
• Installing a drainage system and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, frost action
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 4D
Pasture and hayland suitability group: F-3

OmC—Omulga silt loam, 6 to 15 percent slopes

Setting

Landform: Terraces and valley fills
Position on the landform: Benches along streams
Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 9 inches—brown, friable silt loam

Subsoil:
9 to 26 inches—yellowish brown, friable silt loam
26 to 40 inches—a fragipan of yellowish brown, mottled, very firm, brittle silty clay loam
40 to 70 inches—yellowish brown, mottled, friable silty clay loam and silt loam

Substratum:
70 to 80 inches—yellowish brown, mottled, firm silty clay loam

Soil Properties and Qualities

Drainage class: Moderately well suited
Seasonal high water table: 2.0 to 3.5 feet
Depth class: Very deep
Root zone: Moderately deep
Permeability: Moderate above the fragipan and slow in the fragipan
Available water capacity: Moderate
Surface runoff: Medium or rapid

Composition

Omulga soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- Well drained soils, which have a higher content of rock fragments in the subsoil and substratum, do not have a fragipan, and are on convex slopes

Similar inclusions:
- Soils that are mottled in the upper part of the subsoil
- Soils that have a higher content of sand and rock fragments in the surface layer and subsoil

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited
Major management concerns: Erosion, tilth, organic matter content, crusting, wetness in seepy areas
Management measures:
- A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth and organic matter content, reduce the runoff rate, and control erosion.
- Leaving crop residue on the surface and tilling within the proper range of moisture content help to prevent crusting.
- Installing subsurface drains helps to overcome the wetness in seepy areas.

Pasture

Suitability: Well suited
Major management concerns: Erosion in overgrazed or plowed areas, compaction
Management measures:
- Companion crops and conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, reduce the hazard of erosion.
- Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Windthrow hazard; plant competition; limitations for haul roads and log landings
Management measures:
- Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
- Removing vines and the less desirable trees and shrubs helps to control plant competition.
- Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness; dwellings without basements—wetness, shrink-swell potential, slope

Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Buildings should be designed so that they conform to the natural slope of the land.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Seasonal wetness, slow permeability in the fragipan
Management measures:
• Enlarging the absorption area and installing an alternating absorption field system improve the capacity of the field to absorb effluent.
• Installing perimeter drains helps to overcome the wetness.
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, wetness, slow permeability in the fragipan
Management measures:
• Grading the soil so that it has a more desirable slope, installing a drainage system, and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Low strength, frost action, erosion
Management measures:
• Providing suitable base material helps to prevent the damage caused by low strength and frost action.
• Building local roads and streets on the contour and seeding roadcuts help to control erosion.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4D
Pasture and hayland suitability group: F-3

Or—Orrville silt loam, occasionally flooded

Setting

Landform: Flood plains
Position on the landform: Flats along streams
Slope: 0 to 2 percent
Size of areas: 5 to 200 acres

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown, friable silt loam

Subsoil:
10 to 19 inches—brown, mottled, friable silt loam
19 to 31 inches—grayish brown, mottled, friable silty clay loam and loam

Substratum:
31 to 65 inches—grayish brown, yellowish brown, and dark gray, mottled, friable sandy loam
65 to 80 inches—gray, mottled, friable gravelly sandy loam

Soil Properties and Qualities

Drainage class: Somewhat poorly drained
Seasonal high water table: 1.0 to 2.5 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Slow

Composition

Orrville soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• Small, scattered areas of the well drained Nolin soils, which have a lower content of sand and rock fragments in the subsoil
Similar inclusions:
• Soils that have a lower content of clay and a higher content of sand and rock fragments in the subsoil
• Soils that have a lower content of sand and rock fragments in the subsoil

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Well suited to corn, small grain, and hay if drained
Major management concerns: Flooding, wetness, crusting
Management measures:
• This soil is better suited to crops that can be planted after the normal period of flooding than to crops planted early in spring.
• Applying a system of conservation tillage that leaves crop residue on the surface and tilling within the proper range of moisture content help to prevent crusting.
• Installing a subsurface drainage system in areas where outlets are available and establishing grassed waterways help to overcome the wetness by moving runoff from the adjacent uplands to natural drainageways.

Pasture

Suitability: Well suited
Major management concerns: Compaction
Management measures:
• Pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.
• Because of the seasonal wetness and the potential for frost action, this soil is better suited to red clover and ladino clover than to alfalfa.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Logging should be done during dry periods or when the soil is frozen.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—flooding, wetness

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Flooding, wetness

Camp areas

Suitability: Generally unsuited
Major management concerns: Flooding, wetness

Paths and trails

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• Installing a drainage system helps to overcome the wetness.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Flooding, frost action
Management measures:
• Building local roads and streets on suitable fill material above the expected high flood levels helps to prevent the damage caused by flooding.
• Providing suitable base material helps to prevent the damage caused by frost action.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 5A
Pasture and hayland suitability group: C-3

OsB—Oshtemo loam, 2 to 6 percent slopes

Setting

Landform: Stream terraces
Position on the landform: Treads
Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, very friable loam

Subsoil:
10 to 30 inches—yellowish brown, friable sandy loam
30 to 40 inches—yellowish brown and strong brown, loose loamy sand and sandy loam

Substratum:
40 to 80 inches—yellowish brown, very friable stratified sandy loam and loamy sand having thin strata of fine sandy loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately rapid
Available water capacity: Moderate
Surface runoff: Medium

Composition

Oshtemo soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately well drained Glenford soils, which have more silt and are on the more sloping parts of the landscape
Similar inclusions:
• Soils that have more silt and clay in the substratum

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—idle land

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Droughtiness, erosion, tilth, organic matter content, leaching of nutrients
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion, conserve moisture, and maintain tilth and organic matter content.
• Smaller, more timely applications of lime and fertilizer minimize the loss of nutrients by leaching.

Pasture

Suitability: Well suited
Major management concerns: Droughtiness, erosion
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition
Management measures:
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Well suited

Septic tank absorption fields

Suitability: Well suited

Camp areas

Suitability: Well suited

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Well suited

Interpretive Groups

Land capability classification: IIIs
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-1

Pe—Peoga silt loam, rarely flooded

Setting

Landform: Low stream terraces
Position on the landform: Treads
Slope: 0 to 2 percent
Size of area: 22 acres

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown, friable silt loam

Subsoil:
10 to 60 inches—grayish brown, light brownish gray, and yellowish brown, mottled, firm silty clay loam

Substratum:
60 to 80 inches—gray, mottled, firm silty clay loam

Soil Properties and Qualities

Drainage class: Poorly drained
Seasonal high water table: Within a depth of 1 foot
Depth class: Very deep
Root zone: Very deep but restricted by the seasonal high water table
Permeability: Slow
Available water capacity: High
Surface runoff: Very slow

Composition

Peoga soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Somewhat poorly drained soils on slight rises and flats

Similar inclusions:
• Soils that have more clay in the subsoil and substratum

Use and Management

Land Use: Dominant uses—cropland; other uses—idle land

Cropland

Suitability: Moderately well suited to corn, small grain, and hay if drained
Major management concerns: Seasonal wetness, compaction, tilth
Management measures:
• Surface and subsurface drainage systems help to overcome the wetness.
• Cover crops and a system of conservation tillage that leaves crop residue on the surface improve tilth and increase the rate of water infiltration.
• Tilling within the proper range of moisture content is important because the soil becomes compacted and cloddy if worked when it is wet and sticky.

Pasture

Suitability: Moderately well suited if drained
Major management concerns: Compaction, maintaining good forage stands
Management measures:
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.
• Proper stocking rates, proper plant selection, pasture rotation, mowing to control weeds, and timely applications of lime and fertilizer help to maintain a good stand of key forage plants.

Woodland

Suitability: Moderately well suited
Major management concerns: Seedling mortality; windthrow hazard; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Logging should be done when the soil is frozen or during the drier parts of the year.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate.
• Harvesting procedures that do not leave the remaining trees widely spaced or isolated reduce the windthrow hazard.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Site preparation and planting should be done during dry periods.

Buildings

Suitability: Generally unsuited
Major management concerns: Seasonal wetness, flooding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Seasonal wetness, slow permeability

Camp areas

Suitability: Generally unsuited
Major management concerns: Seasonal wetness, flooding

Paths and trails

Suitability: Poorly suited
Major management concerns: Seasonal wetness
Management measures:
• A drainage system is needed.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Low strength, wetness, frost action
Management measures:
• Installing a drainage system and providing suitable base material help to prevent the damage caused by low strength, wetness, and frost action.

Interpretive Groups

Land capability classification: IIIw
Woodland ordination symbol: 5W
Pasture and hayland suitability group: C-2

RcB—Richland silt loam, 2 to 6 percent slopes

Setting

Landform: Uplands
Position on the landform: Foot slopes, fans, and toe slopes
Size of areas: 5 to 25 acres

Typical Profile

Surface layer:
0 to 12 inches—brown, friable silt loam

Subsoil:
12 to 52 inches—yellowish brown, friable silt loam, clay loam, and gravelly clay loam
52 to 56 inches—yellowish brown, friable stratified gravelly loam and gravelly clay loam

Substratum:
56 to 80 inches—yellowish brown, friable gravelly loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: 3 to 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Medium

Composition

Richland soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- Moderately well drained soils in slight depressions
- Nolin soils, which have more silt in the subsoil and are in the lower positions on floodplains

Similar inclusions:
- Soils that have a surface layer of gravelly loam

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Erosion, crusting
Management measures:
- A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour farming, and cover crops help to reduce the runoff rate, control erosion, and minimize deterioration of tilth.
- Leaving crop residue on the surface reduces the erosion hazard and helps to prevent crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
- Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; equipment limitations for haul roads and log landings
Management measures:
- Applying gravel or crushed stone on haul roads and log landings improves soil strength.
- Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness, shrink-swell potential; dwellings without basements—shrink-swell potential
Management measures:
- Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
- Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
- Installing perimeter drains around the absorption fields helps to overcome the wetness.

Camp areas

Suitability: Well suited
Major management concerns: Stoniness
Management measures:
- The stones can be easily removed.

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Shrink-swell potential, low strength
Management measures:
- Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by low strength.

Interpretive Groups

Land capability classification: IIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-1

RcC—Richland silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Foot slopes, fans, and toe slopes
Size of areas: 5 to 15 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 52 inches—dark yellowish brown, brown, and yellowish brown, friable gravelly clay loam

Substratum:
52 to 64 inches—brown, friable very gravelly loam
64 to 80 inches—yellowish brown, mottled, friable gravelly silty clay loam and gravelly clay loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: 3 to 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Rapid

Composition

Richland soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Moderately well drained soils in the less sloping areas and along drainageways
Similar inclusions:
• Soils that have a surface layer of gravelly loam

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, tilth
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, control erosion, and minimize deterioration of tilth.
• Leaving crop residue on the surface reduces the erosion hazard and helps to prevent crusting.
• Tilling within the proper range of moisture content also helps to prevent crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; limitations for haul roads and log landings
Management measures:
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—wetness, slope, shrink-swell potential; dwellings without basements—shrink-swell potential, slope
Management measures:
• Waterproofing basement walls and installing drains at the base of footings help to keep basements dry.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Wetness
Management measures:
• Installing perimeter drains around the absorption field helps to overcome the wetness.

Camp areas

Suitability: Moderately well suited
Major management concerns: Stoniness, slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the slope.
• Small stones can be easily removed.

Paths and trails

Suitability: Well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Shrink-swell potential, low strength, slope
Management measures:
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by low strength.
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 5A
Pasture and hayland suitability group: A-1

RgD—Rigley loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 8 inches—brown, friable loam

Subsoil:
8 to 50 inches—yellowish brown and brown, friable loam and channery sandy loam

Substratum:
50 to 63 inches—brown and yellowish brown, friable channery sandy loam and very channery sandy loam

Bedrock:
63 to 66 inches—brown, soft sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderately rapid
Available water capacity: Moderate
Surface runoff: Rapid

Composition

Rigley soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep Dekalb soils, which have a higher content of coarse fragments in the subsoil and are in landscape positions similar to those of the Rigley soil
• The moderately deep Gilpin soils, which have more silt and clay in the subsoil and are in landscape positions similar to those of the Rigley soil
Similar inclusions:
• Soils that are shallower to bedrock

Use and Management

Land Use: Dominant uses—cropland; other uses—pasture and woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, droughtiness
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to reduce the runoff rate, prevent excessive soil loss, and conserve moisture.
• Because of the limited available water capacity, this soil is better suited to crops that mature early in the growing season.
• Smaller, more timely applications of lime and fertilizer minimize the loss of nutrients by leaching.

Pasture

Suitability: Moderately well suited

Major management concerns: Erosion in plowed or overgrazed areas, droughtiness
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, help to control erosion and conserve moisture.
• Mowing to control weeds and timely applications of lime and fertilizer help to maintain a good stand of key forage plants.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.
• An aeration septic tank absorption field that has a suitable outlet is an effective alternative system.

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: A-2

RgE—Rigley loam, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 3 to 15 acres

Typical Profile

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 4 inches—very dark grayish brown, friable loam

Subsoil:
4 to 44 inches—yellowish brown and light yellowish brown, friable loam and channery sandy loam

Substratum:
44 to 75 inches—dark yellowish brown and light yellowish brown, friable very channery and extremely channery sandy loam

Bedrock:
75 to 80 inches—yellowish brown, soft sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet

Depth class: Very deep
Root zone: Very deep
Permeability: Moderately rapid
Available water capacity: Moderate
Surface runoff: Very rapid

Composition

Rigley soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Small, scattered areas of Hazleton soils, which have a higher content of sandstone fragments in the subsoil
Similar inclusions:
• Soils that are shallower to bedrock

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Slope, erosion
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• No-till seeding helps to control erosion.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Slope, erosion in plowed or overgrazed areas
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• Proper stocking rates, pasture rotation, mowing to control weeds, and timely applications of lime and fertilizer help to reduce erosion, prevent overgrazing, and maintain stands.
• Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality on south aspects; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Mulching around seedlings reduces the seedling mortality rate on south aspects.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Establishing paths and trails on the contour reduces the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline.
• Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: A-3

Tg—Tioga silt loam, occasionally flooded

Setting

Landform: Flood plains
Position on the landform: Flats along streams
Size of areas: 20 to 200 acres

Typical Profile

Surface layer:
0 to 10 inches—dark grayish brown, friable silt loam

Subsurface layer:
10 to 18 inches—brown, friable loam

Subsoil:
18 to 26 inches—brown, friable fine sandy loam
26 to 36 inches—brown, very friable fine sandy loam and sandy loam

Substratum:
36 to 60 inches—dark yellowish brown, very friable stratified sandy loam, fine sandy loam, and loam
60 to 80 inches—dark yellowish brown and grayish brown, mottled, very friable sandy loam and stratified sandy loam, loam, and silt loam

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: 3 to 6 feet
Depth class: Very deep
Root zone: Very deep
Permeability: Moderate or moderately rapid
Available water capacity: Moderate
Surface runoff: Slow

Composition

Tioga soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
- The somewhat poorly drained Orrville soils in slight depressions
- Melvin soils in oxbows and old channels

Similar inclusions:
- Soils that have more clay in the subsoil and in the upper part of the substratum

Use and Management

Land Use: Dominant uses—pasture; other uses—cropland and woodland

Cropland

Suitability: Well suited to corn, small grain, and hay
Major management concerns: Flooding, crusting
Management measures:
- A system of conservation tillage that leaves crop residue on the surface helps to prevent excessive soil loss and surface crusting.
- Tilling within the proper range of moisture content also helps to prevent crusting.
- Floodwater sometimes leaves sediment on hayland making forage plants unsuitable for hay.

Pasture

Suitability: Well suited
Major management concerns: Compaction
Management measures:
- Pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

Woodland

Suitability: Well suited
Major management concerns: Plant competition; limitations for haul roads and log landings
Management measures:
- Removing vines and the less desirable trees and shrubs helps to control plant competition.
- Trees can be harvested when the soil is not flooded.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—flooding

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Flooding, wetness, poor filter

Camp areas

Suitability: Generally unsuited
Major management concerns: Flooding

Paths and trails

Suitability: Well suited

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Flooding
Management measures:
- Constructing roads and streets on suitable fill material above the expected high flood levels helps to prevent the damage caused by flooding and frost action.

Interpretive Groups

Land capability classification: IIw
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-5

Uc—Udorthents-Pits complex

Setting

Landform: Uplands
Position on the landform: Areas that have recently been surface mined for coal (fig. 6)
Size of areas: 5 to 100 acres

Description of Components

Udorthents

Mixture of rock fragments and partly weathered, fine-earth material in cone-shaped piles 10 to 70 feet high

Pits

The nearly level area between vertical highwalls and Udorthents

Soil Properties and Qualities

Surface runoff: Udorthents—very rapid; Pits—very slow or ponded
Other properties: Variable

Composition

Udorthents: 60 percent
Pits: 30 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
- Moderately deep and deep soils around the edge of the mined areas or in small, scattered areas within the mined areas
- Temporary sedimentation ponds

Use and Management

Land Use: Dominant uses—temporarily idle land until regraded to a landscape similar to what was

Figure 6.—An exposed highwall in an area of Udorthents-Pits complex mined for coal.

present before mining; other uses—haul roads and cover crops on stockpiles of resoiling material

Management measures:
• Onsite investigation is needed to determine suitability for specific uses.
• Typically, piles are regraded, pits are filled, and vegetation is established within several years after mining is completed.

Interpretive Groups

Land capability classification: Not assigned
Woodland ordination symbol: Not assigned
Pasture and hayland suitability group: Not assigned

UpC2—Upshur silty clay loam, 6 to 15 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 7 inches—reddish brown, friable silty clay loam

Subsoil:
7 to 42 inches—reddish brown, firm clay and silty clay
42 to 48 inches—dark reddish brown, firm silty clay loam

Substratum:
48 to 64 inches—dark reddish brown, firm silty clay loam

Bedrock:
64 to 66 inches—soft shale

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep but restricted by the clayey subsoil
Permeability: Slow
Available water capacity: Moderate
Surface runoff: Rapid
Shrink-swell potential: High
Distinctive soil properties: Removal of part of the original surface layer through erosion

Composition

Upshur soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• Lowell soils, which are yellower throughout and are in landscape positions similar to those of the Upshur soil
• The moderately well drained Guernsey soils in scattered concave areas on side slopes
• The moderately deep Berks soils near slope breaks
• The moderately well drained Aaron soils in scattered concave areas on ridgetops
Similar inclusions:
• Soils that have a surface layer of silty clay

Use and Management

Land Use: Dominant uses—pasture and cropland; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• Conservation tillage, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• Tilling within the proper range of moisture content helps to prevent excessive compaction.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; plant competition; equipment limitations for haul roads and log landings
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.

• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with and without basements—shrink-swell potential
Management measures:
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Restricted permeability
Management measures:
• Enlarging the absorption area and installing an alternating absorption field help to overcome the slow permeability.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope, restricted permeability
Management measures:
• Grading the soil so that it has a more desirable slope and installing a large absorption field for the disposal of wastewater help to overcome the limitations.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out the paths and trails on the contour, establishing water bars, and building steps help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Shrink-swell potential, low strength
Management measures:
• Providing suitable base material helps to prevent the damage caused by shrinking and swelling and by low strength.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 3C
Pasture and hayland suitability group: A-1

UpD2—Upshur silty clay loam, 15 to 25 percent slopes, eroded

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Distinctive landscape features: Landslips in some areas
Size of areas: 5 to 20 acres

Typical Profile

Surface layer:
0 to 4 inches—dark reddish brown and reddish brown, friable silty clay loam

Subsoil:
4 to 44 inches—reddish brown and dark reddish brown, firm silty clay

Substratum:
44 to 54 inches—dark reddish brown, firm silty clay loam

Bedrock:
54 to 58 inches—dark reddish brown, soft shale

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep but restricted by the clayey subsoil
Permeability: Slow
Available water capacity: Moderate
Surface runoff: Very rapid
Shrink-swell potential: High
Distinctive soil properties: Removal of part of the original surface layer through erosion

Composition

Upshur soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The moderately deep Berks and Gilpin soils in convex areas
• Small intermingled areas of the Lowell soils, which are yellower throughout
• The moderately well drained Guernsey soils in scattered concave areas on side slopes

Similar inclusions:
• Soils that have a surface layer of silt loam.

Use and Management

Land Use: Dominant uses—pasture and hayland; other uses—woodland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Erosion, tilth, organic matter content
Management measures:
• A system of conservation tillage that leaves crop residue on the surface, grassed waterways, contour stripcropping, and cover crops help to maintain tilth, reduce the runoff rate, and prevent excessive soil loss.
• Tilling within the proper range of moisture content helps to prevent compaction and clodding.

Pasture

Suitability: Poorly suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
• Controlled grazing in winter and during other wet periods helps to prevent excessive compaction.

Woodland

Suitability: Well suited
Major management concerns: Erosion; seedling mortality; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Planting techniques that spread the roots of seedlings and increase soil-root contact reduce the seedling mortality rate on south and west aspects.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Haul roads and log landings should not be built on active landslips.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope, shrink-swell potential, slippage
Management measures:
• Buildings should be designed so that they conform to the natural slope of the land.
• Designing walls that have pilasters and that are reinforced with concrete, supporting the walls with large spread footings, and backfilling around foundations with material that has a low shrink-swell potential help to prevent the structural damage caused by shrinking and swelling.
• Cutting and filling increase the hazard of slippage on hillsides, but installing a drainage system in seepy areas reduces the hazard.

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope, restricted permeability, slippage

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Poorly suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope, shrink-swell potential, low strength
Management measures:
• Providing suitable base material and installing a drainage system help to prevent the damage caused by shrinking and swelling, low strength, and frost action.
• Building local roads and streets on the contour reduces the angle of incline.

- Seeding roadcuts helps to control erosion.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: North aspects—4R; south aspects—3R
Pasture and hayland suitability group: A-2

WhC—Westmoreland silt loam, 6 to 15 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops
Size of areas: 5 to 25 acres

Typical Profile

Surface layer:
0 to 10 inches—brown, friable silt loam

Subsoil:
10 to 40 inches—yellowish brown, friable silt loam, channery silty clay loam, and channery silt loam

Substratum:
40 to 68 inches—yellowish brown, firm very channery silt loam, very channery loam, and very channery silty clay loam

Bedrock:
68 to 70 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Medium or rapid

Composition

Westmoreland soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- The moderately deep Berks soils near the edge of ridgetops
- Soils that have a lower content of fragments and a higher content of silt in the upper part of the subsoil and are in the less sloping areas

Similar inclusions:
- Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Moderately well suited to corn and small grain; well suited to hay
Major management concerns: Erosion, crusting, tilth, organic matter content
Management measures:
- A conservation tillage system that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
- Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
- No-till planting minimizes crusting.

Pasture

Suitability: Well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
- Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.

Woodland

Suitability: Well suited
Major management concerns: Plant competition, limitations for haul roads and log landings
Management measures:
- Removing vines and the less desirable trees and shrubs helps to control plant competition.
- Applying gravel or crushed stone on haul roads and log landings improves soil strength.
- Cutting and filling to a more desirable slope improve sites for log landings.

Buildings

Suitability: Moderately well suited
Major management concerns: Dwellings with basements—depth to bedrock; dwellings without basements—slope
Management measures:
- Removing as little vegetation as possible, mulching, and establishing a temporary plant cover on construction sites help to control erosion.

• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Because bedrock is at a depth of 40 inches in some areas, this soil is better suited to dwellings without basements than to dwellings with basements.
• Blasting is generally necessary in the deeper excavations.

Septic tank absorption fields

Suitability: Moderately well suited
Major management concerns: Slope, depth to bedrock, restricted permeability
Management measures:
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the moderate permeability.
• Installing septic tank absorption fields in natural soil material and adding suitable fill material improve the capacity of the field to absorb effluent.

Camp areas

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Well suited
Major management concerns: Low strength, slope, frost action
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IIIe
Woodland ordination symbol: 4A
Pasture and hayland suitability group: A-1

WhD—Westmoreland silt loam, 15 to 25 percent slopes

Setting

Landform: Uplands
Position on the landform: Ridgetops and side slopes
Size of areas: 5 to 25 acres

Typical Profile

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 38 inches—yellowish brown, friable silt loam and channery silty clay loam

Substratum:
38 to 54 inches—light olive brown, firm very channery silty clay loam

Bedrock:
54 to 56 inches—fine grained, hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Rapid

Composition

Westmoreland soil and similar soils: 90 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• The moderately deep Berks soils on the upper part of slopes
• The moderately well drained Guernsey soils in scattered seepy areas
Similar inclusions:
• Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—cropland and pasture; other uses—woodland

Cropland

Suitability: Poorly suited to corn and small grain; moderately well suited to hay
Major management concerns: Erosion, crusting, tilth, organic matter content

Management measures:
• A permanent plant cover is the best means of controlling erosion.
• A system of conservation tillage that leaves crop residue on the surface, contour stripcropping, and cover crops help to control erosion and to maintain tilth and organic matter content.
• Tilling within the proper range of moisture content and leaving crop residue on the surface help to prevent crusting.
• No-till planting minimizes crusting.
• Installing a subsurface drainage system helps to overcome the wetness in seepy areas of the included Guernsey soils.

Pasture

Suitability: Moderately well suited
Major management concerns: Erosion in plowed or overgrazed areas
Management measures:
• Conservation tillage methods of seedbed preparation, including no-till planting, reduce the hazard of erosion.

Woodland

Suitability: Well suited
Major management concerns: Erosion; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover also help to control erosion.
• Removing vines and the less desirable trees and shrubs helps to control plant competition.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.
• Applying gravel or crushed stone on haul roads improves soil strength.

Buildings

Suitability: Poorly suited
Major management concerns: Dwellings with and without basements—slope
Management measures:
• Removing as little vegetation as possible, mulching, and establishing a temporary plant cover on construction sites help to control erosion.
• Buildings should be designed so that they conform to the natural slope of the land. In some areas land shaping is needed.
• Installing a drainage system in seepy areas of the included Guernsey soils reduces the hazard of slippage.
• Because bedrock is at a depth of 40 inches in some areas, blasting may be necessary in the deeper excavations.

Septic tank absorption fields

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Installing the distribution lines on the contour minimizes the seepage of effluent to the surface.
• Enlarging the absorption area and installing an alternating absorption field system help to overcome the moderate permeability.
• Installing septic tank absorption fields in natural soil material and adding suitable fill material improve the capacity of the field to absorb effluent.
• An aeration septic tank absorption field that has a suitable outlet is an effective alternative system.

Camp areas

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Grading the soil so that it has a more desirable slope helps to overcome the limitation.

Paths and trails

Suitability: Moderately well suited
Major management concerns: Erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion.

Local roads and streets

Suitability: Moderately well suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.

Interpretive Groups

Land capability classification: IVe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: A-2

WhE—Westmoreland silt loam, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 15 to 100 acres

Typical Profile

Surface layer:
0 to 4 inches—brown, friable silt loam

Subsoil:
4 to 40 inches— friable silt loam, channery silt loam, and channery loam; dark yellowish brown in the upper part and yellowish brown in the lower part

Substratum:
40 to 50 inches—yellowish brown, friable very channery clay loam and very channery loam

Bedrock:
50 to 52 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Deep or very deep
Root zone: Deep or very deep
Permeability: Moderate
Available water capacity: Moderate
Surface runoff: Very rapid

Composition

Westmoreland soil and similar soils: 85 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- Hazleton soils, which have a higher content of rock fragments in the subsoil and are on the upper part of slopes
- The moderately well drained Guernsey soils on hillsides characterized by seeps, springs, and landslips

Similar inclusions:
- Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—woodland; other uses—hayland and pasture

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Slope, erosion
Management measures:
- A permanent plant cover is the best means of controlling erosion.
- No-till planting helps to control erosion.
- Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Slope, erosion in plowed or overgrazed areas
Management measures:
- Conservation tillage methods of seedbed preparation that keep plant residue on the surface, including no-till planting, and companion crops reduce the erosion hazard.
- Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Erosion; plant competition; equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting
Management measures:
- Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
- Water bars and a vegetative cover also help to control erosion.
- Applying gravel or crushed stone on haul roads improves soil strength.
- Cutting and filling to a more desirable slope improve sites for log landings.
- Special equipment is needed for site preparation and planting because of the slope.
- Removing vines and the less desirable trees and shrubs helps to control plant competition.

Buildings

Suitability: Generally unsuited
Major management concerns: Dwellings with and without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope, erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by low strength and frost action.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: 4R
Pasture and hayland suitability group: A-3

WmE—Westmoreland-Coshocton complex, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Foot slopes
Distinctive landscape features: A few landslips, seeps, and springs
Size of areas: 15 to 200 acres

Typical Profile

Westmoreland

Surface layer:
0 to 7 inches—brown, friable silt loam

Subsoil:
7 to 40 inches—yellowish brown, firm silty clay loam and channery silty clay loam

Substratum:
40 to 50 inches—yellowish brown, firm very channery silty clay loam

Bedrock:
50 to 52 inches—hard sandstone

Coshocton

Surface layer:
0 to 5 inches—brown, friable silt loam

Subsoil:
5 to 39 inches—yellowish brown, friable loam, silty clay loam, and channery loam; mottled in the lower part
39 to 42 inches—yellowish brown, mottled, firm channery clay loam

Substratum:
42 to 50 inches—yellowish brown, mottled, firm channery silty clay loam

Bedrock:
50 to 54 inches—fractured shale

Soil Properties and Qualities

Drainage class: Westmoreland—well drained; Coshocton—moderately well drained
Seasonal high water table: Westmoreland—at a depth of more than 6 feet; Coshocton—1.5 to 3.0 feet
Depth class: Westmoreland—deep or very deep; Coshocton—deep or very deep
Root zone: Westmoreland—deep or very deep; Coshocton—deep or very deep
Permeability: Westmoreland—moderate; Coshocton—moderately slow or slow
Available water capacity: Westmoreland—moderate; Coshocton—moderate
Surface runoff: Very rapid

Composition

Westmoreland soil and similar soils: 50 to 65 percent
Coshocton soil and similar soils: 25 to 35 percent
Contrasting inclusions: 5 to 15 percent

Inclusions

Contrasting inclusions:
• Hazleton soils, which have a lower content of clay and a higher content of sandstone fragments and sand and are on the upper part of foot slopes
• Scattered areas of Guernsey soils, which have more clay in the subsoil and are subject to slippage
Similar inclusions:
• Soils that are moderately deep to bedrock

Use and Management

Land Use: Dominant uses—woodland and pasture; other uses—hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay

Major management concerns: Slope, erosion
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• No-till seeding helps to control erosion.
• Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Slope, erosion in plowed or overgrazed areas
Management measures:
• A permanent plant cover is the best means of controlling erosion.
• Controlled grazing during wet periods minimizes compaction of the Coshocton soil.
• Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Westmoreland and Coshocton—erosion, plant competition, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Coshocton—seedling mortality on south aspects
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover help to control erosion.
• Planting seedlings that have been transplanted once reduces the seedling mortality rate on south aspects of the Coshocton soil.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on the Westmoreland and Coshocton soils.
• Applying gravel or crushed stone on haul roads and log landings improves soil strength.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns in areas of the Westmoreland soil: Dwellings with and without basements—slope
Major management concerns in areas of the Coshocton soil: Dwellings with basements—slope, wetness; dwellings without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Westmoreland—slope; Coshocton—wetness, restricted permeability, slope

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Slope, erosion
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Westmoreland—slope; Coshocton—low strength, slope, frost action
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength.
• Cutting and filling increase the hazard of slippage on hillsides in the included areas of the Guernsey soils.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: Westmoreland—4R; Coshocton—4R on north aspects, 3R on south aspects
Pasture and hayland suitability group: A-3

WnE—Westmoreland-Dekalb complex, 25 to 40 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 15 to 100 acres

Typical Profile

Westmoreland

Surface layer:
0 to 4 inches—very dark grayish brown, friable loam

Subsoil:
4 to 40 inches—brown, yellowish brown, and dark yellowish brown, friable silt loam, silty clay loam, channery clay loam, and channery loam

Substratum:
40 to 55 inches—light olive brown, firm very channery silty clay loam

Bedrock:
55 to 57 inches—sandy shale

Dekalb

Surface layer:
0 to 4 inches—very dark grayish brown, very friable channery fine sandy loam

Subsoil:
4 to 27 inches—yellowish brown, friable very channery loam

Substratum:
27 to 39 inches—yellowish brown, friable extremely channery sandy loam

Bedrock:
39 to 42 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Westmoreland—deep or very deep; Dekalb—moderately deep
Root zone: Westmoreland—deep or very deep; Dekalb—moderately deep
Permeability: Westmoreland—moderate; Dekalb—rapid
Available water capacity: Westmoreland—moderate; Dekalb—very low
Surface runoff: Very rapid

Composition

Westmoreland soil and similar soils: 55 percent
Dekalb soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
- The deep Rigley soils, which have less silt and clay throughout and are on the upper side slopes

Similar inclusions:
- Soils that have a surface layer of silt loam
- Soils that have a surface layer of channery loam
- Soils that have gray mottles in the lower part of the subsoil
- Soils that have a high content of sandstone fragments in the subsoil and are deep to bedrock

Use and Management

Land Use: Dominant uses—woodland; other uses—pasture and hayland

Cropland

Suitability: Generally unsuited to corn and small grain; poorly suited to hay
Major management concerns: Slope, erosion
Management measures:
- A permanent plant cover is the best means of controlling erosion.
- No-till seeding helps to control erosion.
- Special equipment is needed because of the slope.

Pasture

Suitability: Poorly suited
Major management concerns: Slope, erosion in plowed or overgrazed areas
Management measures:
- A permanent plant cover is the best means of controlling erosion.
- Special equipment is needed because of the slope.

Woodland

Suitability: Well suited
Major management concerns: Westmoreland and Dekalb—equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Westmoreland—erosion, plant competition; Dekalb—seedling mortality
Management measures:
- Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion on the Westmoreland soil.
- Water bars and a vegetative cover help to control erosion on the Westmoreland soil.
- Removing vines and the less desirable trees and shrubs helps to control plant competition on the Westmoreland soil.
- Mulching around seedlings reduces the seedling mortality rate on the Dekalb soil.
- Applying gravel or crushed stone on haul roads improves soil strength.
- Cutting and filling to a more desirable slope improve sites for log landings.
- Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited

Major management concerns in areas of the Westmoreland soil: Dwellings with and without basements—slope
Major management concerns in areas of the Dekalb soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Westmoreland—slope; Dekalb—slope, depth to bedrock, poor filter

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Westmoreland—slope, erosion; Dekalb—slope
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Westmoreland and Dekalb—slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength in areas of the Westmoreland soil.
• Blasting may be necessary in the deeper excavations in areas of the Dekalb soil.
• Large stones can be removed.

Interpretive Groups

Land capability classification: VIe
Woodland ordination symbol: Westmoreland—4R; Dekalb—4R on north aspects, 3R on south aspects
Pasture and hayland suitability group: Westmoreland—A-3; Dekalb—F-2

WnF—Westmoreland-Dekalb complex, 40 to 70 percent slopes

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 20 to 400 acres

Typical Profile

Westmoreland

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 4 inches—very dark grayish brown, very friable loam

Subsurface layer:
4 to 8 inches—yellowish brown, very friable loam

Subsoil:
8 to 15 inches—yellowish brown, friable loam
15 to 32 inches—brown and yellowish brown, friable clay loam and channery clay loam

Substratum:
32 to 48 inches—yellowish brown, firm extremely channery loam

Bedrock:
48 to 50 inches—hard sandstone

Dekalb

Forest litter:
2 inches to 0—partially decomposed leaf litter

Surface layer:
0 to 4 inches—very dark grayish brown, very friable channery fine sandy loam

Subsoil:
4 to 32 inches—yellowish brown, very friable and friable channery fine sandy loam, channery sandy loam, and very channery sandy loam

Substratum:
32 to 37 inches—yellowish brown, friable extremely channery sandy loam

Bedrock:
37 to 40 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Westmoreland—deep or very deep; Dekalb—moderately deep
Root zone: Westmoreland—deep or very deep; Dekalb—moderately deep
Permeability: Westmoreland—moderate; Dekalb—rapid

Available water capacity: Westmoreland—moderate; Dekalb—very low
Surface runoff: Very rapid

Composition

Westmoreland soil and similar soils: 55 percent
Dekalb soil and similar soils: 30 percent
Contrasting inclusions: 15 percent

Inclusions

Contrasting inclusions:
• The deep Rigley soils, which have less silt and clay throughout than the Westmoreland soil and are on the upper side slopes
Similar inclusions:
• Soils that have a surface layer of silt loam
• Soils that have a surface layer of channery loam
• Soils that have gray mottles in the lower part of the subsoil
• Soils that have a high content of sandstone fragments throughout and are deep to bedrock

Use and Management

Land Use: Dominant uses—woodland

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Slope, erosion

Pasture

Suitability: Generally unsuited
Major management concerns: Slope, erosion

Woodland

Suitability: Moderately well suited
Major management concerns: Westmoreland and Dekalb—erosion, equipment limitation on haul roads, log landings, skid trails, logging areas, site preparation, and planting; Westmoreland—plant competition; Dekalb—seedling mortality
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and vegetative cover help to control erosion.
• Removing vines and the less desirable trees and shrubs helps to control plant competition on the Westmoreland soil.
• Mulching around seedlings reduces the seedling mortality rate on the Dekalb soil.
• Cutting and filling to a more desirable slope improve sites for log landings.
• Special equipment is needed for site preparation and planting because of the slope.

Buildings

Suitability: Generally unsuited
Major management concerns in areas of the Westmoreland soil: Dwellings with and without basements—slope
Major management concerns in areas of the Dekalb soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Westmoreland—slope; Dekalb—slope, depth to bedrock, poor filter

Camp areas

Suitability: Generally unsuited
Major management concerns: Slope

Paths and trails

Suitability: Poorly suited
Major management concerns: Westmoreland—slope, erosion; Dekalb—slope
Management measures:
• Laying out paths and trails on the contour and establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength in areas of the Westmoreland soil.
• Blasting may be necessary in the deeper excavations in areas of the Dekalb soil.
• Large stones can be removed.

Interpretive Groups

Land capability classification: VIIe
Woodland ordination symbol: Westmoreland—4R; Dekalb—4R on north aspects, 3R on south aspects
Pasture and hayland suitability group: H-1

WoF—Westmoreland-Dekalb complex, 25 to 70 percent slopes, extremely bouldery

Setting

Landform: Uplands
Position on the landform: Side slopes
Size of areas: 20 to 250 acres

Typical Profile

Westmoreland

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 3 inches—dark brown, friable loam

Subsoil:
3 to 12 inches—brown and yellowish brown, friable loam
12 to 32 inches—yellowish brown, firm silty clay loam

Substratum:
32 to 42 inches—yellowish brown, friable very channery loam

Bedrock:
42 to 44 inches—hard sandstone

Dekalb

Forest litter:
1 inch to 0—partially decomposed leaf litter

Surface layer:
0 to 3 inches—very dark grayish brown, friable channery loam

Subsoil:
3 to 31 inches—yellowish brown, friable channery loam, very channery loam, and very channery sandy loam

Bedrock:
31 to 33 inches—hard sandstone

Soil Properties and Qualities

Drainage class: Well drained
Seasonal high water table: At a depth of more than 6 feet
Depth class: Westmoreland—deep or very deep; Dekalb—moderately deep
Root zone: Westmoreland—deep or very deep; Dekalb—moderately deep
Permeability: Westmoreland—moderate; Dekalb—rapid
Available water capacity: Westmoreland—moderate; Dekalb—very low
Surface runoff: Very rapid
Distinctive soil properties: Angular boulders, 2 to 20 feet in diameter, cover 3 to 15 percent of the surface

Composition

Westmoreland soil and similar soils: 50 percent
Dekalb soil and similar soils: 40 percent
Contrasting inclusions: 10 percent

Inclusions

Contrasting inclusions:
• The moderately well drained Guernsey soils, which have a higher content of clay in the subsoil than the Westmoreland and Dekalb soils and are on benches having some seeps and springs
Similar inclusions:
• Soils that are medium textured and are moderately deep to bedrock
• Soils that have a high content of sandstone fragments throughout and are deep to bedrock
• Soils that have a surface layer of channery loam

Use and Management

Land Use: Dominant uses—woodland (fig. 7)

Cropland

Suitability: Generally unsuited to corn, small grain, and hay
Major management concerns: Slope, erosion

Pasture

Suitability: Generally unsuited
Major management concerns: Slope, erosion

Woodland

Suitability: Moderately well suited
Major management concerns: Westmoreland and Dekalb—erosion, equipment limitations for haul roads, log landings, skid trails, logging areas, site preparation, and planting; Westmoreland—plant competition; Dekalb—seedling mortality
Management measures:
• Building haul roads and skid trails on the contour facilitates the use of equipment and helps to control erosion.
• Water bars and a vegetative cover help to control erosion.
• Mulching around seedlings reduces the seedling mortality rate on the Dekalb soil.

Figure 7.—A wooded area of Westmoreland-Dekalb complex, 25 to 70 percent slopes, extremely bouldery.

- Removing less desirable trees and shrubs helps to control plant competition on the Westmoreland soil.
- Cutting and filling to a more desirable slope improve sites for log landings.
- Special equipment is needed for site preparation and planting because of the slope.
- Boulders limit the use of equipment.

Buildings

Suitability: Generally unsuited
Major management concerns in areas of the Westmoreland soil: Dwellings with and without basements—slope
Major management concerns in areas of the Dekalb soil: Dwellings with basements—slope, depth to bedrock; dwellings without basements—slope

Septic tank absorption fields

Suitability: Generally unsuited
Major management concerns: Westmoreland—slope; Dekalb—slope, depth to bedrock, poor filter

Camp areas

Suitability: Generally unsuited
Major management concerns: Westmoreland—slope; Dekalb—slope, stoniness

Paths and trails

Suitability: Poorly suited
Major management concerns: Westmoreland—slope, erosion; Dekalb—slope
Management measures:
- Laying out paths and trails on the contour and

establishing water bars, steps, and switchbacks help to control erosion and reduce the angle of incline.

Local roads and streets

Suitability: Poorly suited
Major management concerns: Slope
Management measures:
• Constructing roads and streets on the contour reduces the angle of incline and the hazard of erosion.
• Seeding roadcuts helps to control erosion.
• Providing suitable base material helps to prevent the damage caused by frost action and low strength in areas of the Westmoreland soil.
• Blasting may be necessary in the deeper excavations in areas of the Dekalb soil.
• Large stones can be removed.

Interpretive Groups

Land capability classification: VIIs
Woodland ordination symbol: Westmoreland—4R; Dekalb—4R on north aspects, 3R on south aspects.
Pasture and hayland suitability group: H-1

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The soils in the survey area are assigned to various interpretive groups at the end of each map unit description and in some of the tables. The groups for each map unit also are shown under the heading “Interpretive Groups,” which follows the tables at the back of this survey.

Crops and Pasture

Ray Rummell, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Crops

In 1985, about 230,900 acres, or 89 percent of the total acreage in the county, was used as farmland (USDA 1985). About 41,900 acres of the farmland was used for the production of crops, and about 75,000 acres was used as pasture (fig. 8). In 1987, about 4,600 acres was used for corn, 1,900 acres for oats, less than 1,000 acres for wheat, 23,200 acres for hay, and a relatively small number of acres for orchards (Carter, Matthews, and DeLong 1987).

The potential of the soils in Harrison County for increased production of food is excellent. About 41,800 acres of potential cropland is used as woodland and about 21,200 acres as pasture (USDA 1985). Production can be increased by applying the latest production techniques.

Cropping patterns have changed in recent years. In the past, crop rotations that included 4 years or more of hay were a standard practice. This practice has changed somewhat with the major increase in corn production through the use of no-till farming or another system of conservation tillage that leaves crop residue on the surface. The addition of corn to some rotations, however, has caused excessive rates of erosion.

Various soil characteristics such as soil fertility, drainage, and tilth need special attention in Harrison

Figure 8.—A drained area of Orrville silt loam, occasionally flooded, used for corn. Guernsey silty clay loam, 15 to 25 percent slopes, eroded, is on the lower side slopes.

County. Reducing erosion, improving water quality, and improving forage production are also of concern to landowners and operators.

Soil erosion is the major problem in areas of cropland in the county. It is damaging in two ways. First, productivity is reduced because part of the surface layer is removed and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Guernsey and Lowell soils. Erosion also reduces productivity on soils that have a restricted root zone or are droughty. Examples are the Berks, Gilpin, and Germano soils. Second, soil erosion results in sedimentation of lakes and streams and thus reduces water quality. Reducing the hazard of erosion improves the quality of water for municipal and recreational uses and for fish and wildlife.

Erosion-control practices provide a protective surface layer, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the soil for extended periods can hold soil losses to amounts that do not reduce the productive capacity of the soils. A conservation tillage system that leaves crop residue on the surface increases the rate of water infiltration and reduces the hazards of runoff and erosion. No-till is the most effective conservation tillage method when planting corn. It can be adapted to most of the soils in the survey area but is more difficult to use successfully on soils that have a surface layer of silty clay loam, such as Aaron, Guernsey, and Lowell soils, or on soils that drain slowly or moderately slowly, such as Fitchville and Orrville soils.

About 19 percent of the cropland in the county needs some form of erosion control (USDA 1985). Contour stripcropping and conservation tillage are the best methods to control erosion in the county. Cover crops and grassed waterways also help to control

erosion. The grassed waterways, which are natural or constructed, help to dispose of surface water. Natural drainageways are the best sites for grassed waterways. They generally require only a minimum of shaping in order to produce a good channel. The waterway should be designed so that it can be crossed by farm machinery.

Soil fertility is naturally low in most of the soils in the county. It is especially low in Berks, Bethesda, Fairpoint, and Morristown soils. Soils that are commonly associated with outcrops of limestone bedrock are relatively high in natural fertility. Examples are Lowell and Guernsey soils. Nolin, Orrville, and Tioga soils, which are on flood plains, have medium or high natural fertility.

Almost all of the soils in the county are naturally acid in the surface layer. If the soils have never been limed, they require applications of ground limestone to raise the pH level sufficiently for alfalfa and other crops to grow well. Morristown soils commonly are mildly alkaline or moderately alkaline in the surface layer. Applications of lime and fertilizer on all soils should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. Additional information is available from the Agronomy Department of the Ohio State University, the Ohio Agricultural Research and Development Center, and Ohio State University Extension.

Soil moisture is a critical management concern in areas of soils that have a high content of sand in the subsoil, such as Rigley and Germano soils, and in areas of soils that have only a moderately deep root zone, such as Berks and Gilpin soils. It is also a concern in areas of the Bethesda, Fairpoint, and Morristown soils because these soils have a very low water-holding capacity. Yields of row crops and forages grown on all of these soils can be improved by applying practices that help to control runoff and reduce the rate of evaporation. These practices include a system of conservation tillage that leaves crop residue on the surface, winter cover crops, contour stripcropping, and crop rotations that include grasses and legumes.

Soil drainage is a major management concern only in narrow areas along some streams. Some soils are naturally so wet that the production of crops common to the area is generally not possible without installing a drainage system. Examples are the Fitchville and Orrville soils. Some soils on hillsides, such as Coshocton and Guernsey soils, have seepy areas that need random subsurface drains.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water. Soils with good tilth are granular and porous.

In most of the soils used for crops in the county, the surface layer is silt loam and the organic matter content is low to moderate. Generally, the structure of these soils is weak or moderate, and intense rainfall causes the formation of a crust on the surface. When dry, this crust is hard and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Conservation practices that add organic matter improve soil structure. Such practices include a conservation cropping system, conservation tillage, crop residue management, winter cover crops, and contour stripcropping.

Fall plowing is not a good management practice on soils that have a surface loam of silt loam because the soils are susceptible to crusting and erosion. If many of the soils are plowed in the fall, they are nearly as dense and hard at planting time as they were before they were plowed.

Specialty crops grown in the county include produce from orchards and Christmas trees. Soils that are characterized by good natural drainage and that warm up early in the spring are well suited to specialty crops. Examples are Gilpin and Germano soils on uplands.

Pasture

About 29 percent of the acreage in the county is used as pasture or hayland, and another 20 percent is idle land, which is reverting to brush and young tree growth. The idle land has the potential to be used as pasture or hayland. Most of the pasture and hayland is on hillsides adjacent to cultivated areas of less sloping soils. Soils that have a slope of more than 25 percent, however, are generally not suited to pasture or hay. The soils that are used for pasture or hay formed in the underlying shale, siltstone, sandstone, or limestone. They are subject to erosion. The pasture and hayland dominantly support bluegrass and tall grasses. The tall grasses are tall fescue, orchardgrass, and timothy. Many pastures are unimproved and require renovation and brush and weed control.

Some pastures and meadows are overgrazed. Overgrazing has resulted in weedy pastures and in low forage production. The soils are subject to increased erosion because of the sparse, short vegetative cover. Soils in these fields frequently are acid and have low levels of phosphorus and potassium. In time, good management can restore the soils to a much higher level of productivity.

The successful establishment of forage crops requires the selection of quality seed of species and varieties adapted to the area and the soils. Reseeding requires proper seedbed preparation, proper seeding methods and seeding times, and applications of

recommended kinds and amounts of lime and fertilizer. The existing grass and weeds should be killed or suppressed before the desired species are reseeded. The object is to kill the existing sod and leave it on or near the surface as a mulch, which can help to control erosion. Nearly level pastures can be plowed. The vegetation on gently sloping and strongly sloping soils should be killed or suppressed. Pastures should be tilled and seeded on the contour. Application of herbicides in conjunction with conservation tillage reduces the amount of tillage needed to kill the existing vegetation.

No-till seeding is effective on most of the soils in the county, except for the wetter soils. Before this method of seeding is used, the existing vegetation should be suppressed or killed by grazing and herbicides.

April and August are usually the best times for seeding. The forage species can be seeded with a small grain, but in many areas forage production is reduced because of plant competition for light, moisture, and nutrients.

Seeding mixtures should be based on the soil type and the desired pasture management system. Legumes increase the nutrient value of the forage and provide nitrogen, which improves the growth of grasses. Alfalfa and red clover should be seeded on soils that are characterized by good drainage. Ladino clover and alsike clover grow best on the wetter soils. Birdsfoot trefoil, lespedeza, and warm-season grasses are generally not grown as forage in the county.

Applying lime and fertilizer according to the results of soil tests ensures good productivity and lengthens the life of the stand. Weed control by mowing, clipping, and spraying is important for continued high production. Weeds should be mowed before they set seed. Control of insects, such as alfalfa weevil and potato leafhopper, may be necessary. If herbicides are used, all label restrictions should be observed. Harvesting hay, silage, or pasture plants at the proper stage of maturity helps to obtain the maximum quality feed.

Table 5 can be used by farmers, farm managers, conservationists, and extension agents in planning the use of the soil for pasture and hay crops. Yields of orchardgrass-alfalfa hay, timothy-red clover hay, Kentucky bluegrass pasture, and orchardgrass pasture are given in the table. The yields given are those that can be expected under a high level of management. They may vary in any given year because of seasonal rainfall and other climatic factors. Grass yields are dependent on an adequate supply of nitrogen. The indicated yields cannot be achieved without applications of nitrogen fertilizer. An animal unit month (AUM) is the forage requirement for a mature cow with a calf for 1 month. Thus 6 AUM means that 1 acre can provide 6 months or 180 days of pasture for one mature cow with a calf. An AUM also is equal to 1,200 pounds of hay or the equivalent forage. A pasture calendar guide can provide the relative distribution of animal unit days on a monthly basis since they are not evenly distributed throughout the growing season.

At the end of each map unit description, the soil has been assigned to a pasture and hayland suitability group. These groups are based primarily on the suitability of the soil for certain pasture species, management needs, and potential productivity. Detailed interpretations for each pasture suitability group in the county are provided in the “Technical Guide,” which is available in the local office of the Natural Resources Conservation Service. A brief description of the pasture and suitability groups follows.

The soils in *group A* have few limitations affecting the management and growth of climatically adapted plants. Those in *group A-1* are very deep and deep and are well drained. They have a surface layer of loam, silty clay loam, or silt loam. The available water capacity is moderate. Slopes range from 2 to 15 percent. Plants on these soils respond favorably to additions of lime. Frequent applications may be needed to maintain an adequate pH level. A low pH level in the subsoil shortens the life of some deep-rooted legumes in the stand.

The soils in *group A-2* are very deep and deep and are well drained and moderately well drained. They have a surface layer of silty clay loam, loam, or silt loam. Slopes range from 15 to 25 percent. The available water capacity is moderate. Plants on these soils respond favorably to additions of lime. Frequent applications may be needed to maintain an adequate pH level. The low pH level in the subsoil shortens the life of some deep-rooted legumes in the stand. The slope limits the mechanical application of lime and fertilizer. It also limits clipping, mowing, and spraying for weed control. Erosion is a hazard if the pasture is overgrazed or cultivated for reseeding. These soils are suited to no-till reseeding.

The soils in *group A-3* are very deep and deep and are well drained and moderately well drained. They have a surface layer of loam, silty clay loam, or silt loam. The available water capacity is moderate. Slopes range from 25 to 40 percent. These soils generally are not suited to pasture or hay, but some grass pasture is produced.

The soils in *group A-5* are very deep and well drained. They are on flood plains and are frequently or occasionally flooded. The flooding limits these soils for

pasture during periods of stream overflow, and the deposition of sediment by floodwater lowers the quality of the forage. These soils have a surface layer of silt loam. The available water capacity is high or moderate. Slopes are 0 to 2 percent.

The soils in *group A-6* are very deep and deep and are well drained and moderately well drained. They are subject to frost action. Legume-grass mixtures are less likely to be damaged by frost heaving than pure stands of legumes. These soils have a surface layer of silt loam or silty clay loam. The available water capacity is moderate. Slopes range from 2 to 15 percent. These soils respond favorably to additions of lime and fertilizer. Frequent applications may be needed to maintain adequate pH and nutrient levels. These soils are suited to no-till reseeding.

The soils in *group B* are limited by droughtiness. Those in *group B-1* are deep and very deep and are well drained. They have a surface layer of channery sandy loam. The available water capacity is low. Slopes range from 15 to 25 percent. These droughty soils are suited to tall grasses, such as tall fescue, orchardgrass, timothy, and bromegrass. Plants on these soils respond favorably to additions of lime. Frequent applications may be needed to maintain an adequate pH level. A low pH level in the subsoil shortens the life of some deep-rooted legumes in the stand. The substratum of these soils is skeletal.

The soils in *group B-2* are deep and very deep and are well drained. They have a surface layer of channery sandy loam. The available water capacity is low. Slopes range from 25 to 40 percent. These soils generally are not suited to pasture or hay.

The soils in *group B-4* are very deep and well drained. They have been reclaimed after mining. They have a surface layer of silty clay loam. The available water capacity is low. They have a high content of coarse fragments in the substratum. The depth of the root zone varies. Slopes range from 0 to 25 percent.

The soils in *group C* have a high seasonal water table. Those in *group C-1* are very deep and somewhat poorly drained. They have a surface layer of silt loam. The available water capacity is high. Frost action may damage legumes. Including grasses in seeding mixtures minimizes the damage caused by frost heaving. The high seasonal water table limits the rooting depth of forage plants. Shallow-rooted species grow best on these soils. Subsurface drains lower the seasonal high water table. Plants on these soils respond favorably to additions of lime. Frequent applications may be needed to maintain an adequate pH level. The low pH level in the subsoil shortens the life of some deep-rooted legumes in the stand. Slopes range from 0 to 6 percent.

The soils in *group C-2* are very deep and are somewhat poorly drained and poorly drained. They have a surface layer of silt loam or silty clay loam. The available water capacity is moderate or high. The effectiveness of subsurface drains generally is limited by the permeability in the subsoil or the position of the soils on the landscape. Slopes range from 0 to 2 percent.

The soils in *group C-3* are very deep and are somewhat poorly drained and poorly drained. They are on flood plains and are frequently or occasionally flooded. The flooding limits these soils for pasture during periods of stream overflow, and the deposition of sediment by floodwater lowers the quality of the forage. These soils have a surface layer of silt loam. The available water capacity is moderate or high. Frost action may damage legumes. Including grasses in seeding mixtures minimizes the damage caused by frost heaving. The high seasonal water table limits the rooting depth of deep-rooted forage plants. Subsurface drains lower the seasonal high water table. The effectiveness of subsurface drains is limited by the position of the soils on the landscape. Slopes range from 0 to 2 percent.

The soils in *group E* have been mined previously. They have an effective rooting depth of less than 20 inches.

The soils in *group E-1* are very deep and well drained. They have a surface layer of channery silty clay loam. The available water capacity is low. These soils have a high content of coarse fragments in the substratum. Slopes range from 0 to 25 percent.

The soils in *group E-2* are very deep and well drained. They have a surface layer of silty clay loam or channery silty clay loam. The available water capacity is low. These soils have a high content of coarse fragments in the substratum. Slopes range from 25 to 40 percent.

The soils in *group E-3* are very deep and well drained. They have a surface layer of channery silty clay loam. The available water capacity is low. These soils have a high content of coarse fragments in the substratum. Slopes range from 0 to 25 percent.

The soils in *group F* have a root zone that extends to a depth of 20 to 40 inches. They are better suited to forage species that do not have a taproot system because the root zone is limited.

The soils in *group F-1* are moderately deep and well drained. They have a surface layer of channery loam, channery silt loam, fine sandy loam, or silt loam. The available water capacity is very low and low. These droughty soils are suited to tall grasses, such as tall fescue, orchardgrass, bromegrass, and timothy. Plants on these soils respond favorably to additions of

lime. Frequent applications may be needed to maintain an adequate pH level. A low pH level in the subsoil shortens the life of some deep-rooted legumes in the stand. Slopes range from 2 to 25 percent.

The soils in *group F-2* are moderately deep and well drained. They have a surface layer of channery fine sandy loam or channery silt loam. The available water capacity is very low. Slopes range from 25 to 40 percent. These soils generally are not suited to pasture or hay.

The soils in *group F-3* are moderately well drained. They are moderately deep to a fragipan. They have a surface layer of silt loam. The available water capacity is moderate in the root zone. Slopes range from 2 to 15 percent.

The soils in *group H* are too steep to be used for forage production or have been mined previously. The soils in the mined areas have characteristics that prohibit their use as pasture.

The soils in *group H-1* are deep and moderately deep and are well drained. Slope dominantly ranges from 40 to 70 percent. These soils generally are unsuited to pasture and hay.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or the Ohio State University Extension can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have

limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 10,300 acres in the survey area, or nearly 4 percent of the total acreage, meets the soil requirements for prime farmland (USDA 1985). More than 3,200 acres of the prime farmland consists of well drained and moderately well drained soils on ridgetops and benches in the uplands. Nearly 16,000 acres consists of poorly drained, somewhat poorly drained, moderately well drained, and well drained soils on terraces, on flood plains, and on foot slopes, toe slopes, and fans at the base of hillsides.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 7. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Management of Disturbed Lands

Ray Rummell, district conservationist, Natural Resources Conservation Service, helped prepare this section.

By 1990, about 61,350 acres of land in Harrison County had been affected by surface mining. About 85 percent of this land was mined prior to the 1972 Ohio Reclamation law. It generally consists of graded and ungraded ridges and spoil piles where no soil material has been replaced. The soils in these areas are mapped as Bethesda and Morristown soils. Because of the high content of coarse fragments and the low available water capacity, this land is generally unsuited to cropland and poorly suited to pasture. It is used mostly as woodland and habitat for wildlife.

The legislation enacted in 1972 required the restoration of all land mined in the future. The land must be restored to the approximate original contour

and blanketed with topsoil and subsoil from natural soils. Morristown silty clay loam, 0 to 8 percent slopes, was reclaimed by this technique. Reclaimed soils make up about 7,900 acres in Harrison County. They are better suited to agricultural production than unreclaimed soils, but they still have limitations that need to be overcome.

The current law requires that soils identified as prime farmland be replaced in natural sequence to a depth of as much as 48 inches following mining. Most soils in surface-mined areas do not meet the requirements for prime farmland. As a result, most of the mined land is being reclaimed with a minimum of 6 inches of soil material overlying the spoil.

Soil properties must be considered in managing these soils. The organic matter content is considerably lower in mined soils than in natural soils. A high bulk density is common in both the replaced soil material and the underlying graded spoil. The compaction is a result of the use of heavy machinery, especially wheeled reclamation equipment; excessive handling of topsoil material when it is stockpiled and spread; mining and reclamation activities performed under unfavorable moisture conditions; and insufficient time for soil-forming processes to decrease the bulk density. The high bulk density reduces the available water capacity and retards plant growth. As a result, it reduces crop yields.

Typically, the content of rock fragments in mine spoil is 35 to 60 percent, compared to 0 to 15 percent in the surface layer of most soils. The rock fragments reduce the effective root zone and the available water capacity in formerly mined soils. Roots tend to concentrate in the profile where soil and rock fragments adjoin. Few roots penetrate the compact, massive spoil material.

Planting suitable forage species increases the organic matter content, improves soil structure, minimizes compaction, and increases the water infiltration rate, pore space, and root growth in formerly mined soils. Forage species are better soil-building crops than row crops. They also are more effective in reducing the susceptibility to runoff and erosion. Thin stands should be reseeded. Companion crops and conservation tillage seeding methods help to control erosion.

Formerly mined soils generally are unsuited to grazing in winter when they are wet. Winter grazing can result in compaction and damage to plants and can increase the hazard of erosion. Frequent, light applications of fertilizer are better suited to these soils than larger applications because of the loss of plant nutrients through runoff and the concentration of roots in the upper few inches of the soils.

Reclamation practices that improve the suitability of formerly mined soils for agricultural use are as follows:

1. Blanketing the spoil with a thick layer of natural soil material to increase the available water capacity and the effective rooting depth. Each foot of replaced soil material increases the available water capacity by about 1 inch. Moisture retention studies show that most unreclaimed surface mine spoil, such as Morristown channery silty clay loam, 0 to 8 percent slopes, stony, retains about one-fourth as much water as a natural soil, such as Coshocton silt loam, 2 to 6 percent slopes.
2. Keeping the surface soil and subsoil separate and then replacing them in their natural sequence.
3. Minimizing soil compaction. The degree of soil compaction is influenced largely by soil texture, moisture conditions, organic matter content, and soil structure.

Soil compaction can be minimized by not stockpiling soil material if possible. The land should be reclaimed during the mining process. Spreading freshly scalped soil material on graded, formerly mined soils helps to prevent the compaction caused by stockpiling.

Spoil should not be graded when it is wet, and soil material should not be handled when it is wet. Grading the spoil and handling the soil material under wet conditions destroy soil structure and result in the formation of an impermeable zone with each layer that is replaced.

Final grading should held to a minimum. The spoil and the soil material that is replaced should be graded only enough to ensure that slopes are smooth and the soil material is of an even thickness.

The proper equipment should be used, and reclamation activities should be carefully planned. Scraper pans generally have the desirable depth control for soil removal. Wheeled equipment, however, causes much more compaction than tracked equipment. The traffic pattern of wheeled equipment should be carefully controlled in order to minimize compaction. In most areas replacing the soil material beginning at the farthest point from the stockpile or soil removal site is necessary.

Nonessential traffic should be kept out of reclaimed areas. Limiting the traffic to designated roadways that have been built across the slope minimizes the extent of the compaction. When these roadways are no longer needed, they can be reclaimed by such special practices as subsoiling.

Deep tillage practices, such as subsoiling and chisel plowing, loosen up compacted soil. They break up the compacted layers and thus increase the movement of air and water. In reclaimed areas of

prime farmland, both the replaced subsoil layer and topsoil layer may need deep tillage in separate operations during reclamation to avoid mixing the two layers.

4. Properly designing and constructing water-control systems that help to control runoff and erosion (fig. 9). Diversions reduce the length of the slope and thus reduce the velocity of runoff and the amount of erosion. They have been used successfully on slopes of as much as 30 percent in reclaimed areas.

A series of small, properly designed sediment-control structures in or immediately adjacent to the surface mined area is generally more practical than large impoundments away from the site. The smaller, onsite sediment-control structures can be removed after reclamation has been completed, and the sediment and the embankment material can be spread over the immediate area.

A mulch of hay or straw that is crimped into the soil by straight blade disk helps to control erosion on short slopes. About 2 tons of mulch per acre is generally recommended; however, a higher rate is needed on steep slopes if erosion control is the primary objective.

Woodland

Randy Clum, service forester, Ohio Department of Natural Resources, helped prepare this section.

Approximately 45 percent of Harrison County is wooded. The wooded acreage is mainly privately owned stands of timber and farm woodlots, but woodland near Harrison State Forest is state owned and woodland near Tappan Lake, Clendening Lake, and Piedmont Lake is owned by the Muskingum Watershed Conservancy District. The most extensive

Figure 9.—A drainageway lined with riprap in a reclaimed area of Morristown silty clay loam, 8 to 25 percent slopes.

Figure 10.—A wooded area of Westmoreland-Dekalb complex, 25 to 40 percent slopes.

wooded areas are in the northern and western parts of the county.

The wooded areas mainly support mixed hardwoods. The major forest type is oak-hickory. The dominant woodland species are oak, hickory, ash, yellow popular, black cherry, and red maple. Most of the wooded areas are on the moderately steep to very steep soils that formed in material weathered from sandstone, shale, siltstone, or limestone. Gilpin, Dekalb, Berks, Westmoreland, and Hazleton soils are common in these areas (fig. 10). Much of the woodland is on slopes along streams and drainageways. Some tracts of land that formerly were used for hay and pasture are reverting to woodland.

Some of the woodland in the county shows the results of poor management. The best trees have been cut down in these areas, and diseased or damaged trees, which have not been cut down, have been left, taking up valuable growing space on the excellent woodland soils. In many wooded areas grapevines are killing or deforming valuable forest trees, thus lowering forest productivity. Cattle have been allowed to graze in wooded areas and have damaged some woodland by destroying leaf litter and desirable seedlings, damaging roots, and compacting the soil. Additional information on woodland management can be obtained from the local offices of the Natural Resources Conservation Service and the Ohio Department of Natural Resources, Division of Forestry.

Soils differ greatly in their productivity for woodland. The factors that influence tree growth are essentially the same as those that influence annual crops and pasture. The major difference is that tree roots penetrate the soil to a greater depth, especially around rock fragments in the lower part of the profile. The aspect and the position of the soil on the landscape also are important factors.

The aspect is the compass direction toward which a slope faces. North aspects are those slopes that have

an azimuth of 355 to 95 degrees. South aspects have an azimuth of 96 to 354 degrees (Carmean 1967). Trees grow better on north and east aspects, which are less exposed to the prevailing winds and to direct sunrays and thus have more soil moisture. Some of the factors that make south and west aspects less productive are a higher soil temperature, a high evaporation rate, earlier snowmelt, and more freezing and thawing.

The position of the soil on the landscape is important in determining the amount of moisture available for tree growth. The supply of soil moisture commonly increases as elevation on a slope decreases, partly because of seepage downslope. The lower part of the slopes has deeper soils, less evaporation, and lower soil temperatures.

The slope is another important factor affecting woodland management. Steep and very steep slopes seriously limit the use of equipment. As the percent of slope increases, the rate of water infiltration decreases and the rate of runoff and the hazard of erosion increase. Erosion reduces the amount of soil available for water storage. Severe erosion removes the surface layer and exposes the less porous subsoil, thus increasing the runoff rate and lowering the rate of water infiltration. Under these conditions, tree growth and natural reseeding are adversely affected.

Soil reaction and fertility influence the growth of different kinds of trees. For example, black walnut trees grow well on Tioga, Nolin, Glenford, Keene, Richland, and other soils that have a higher, natural content of lime in the subsoil. Growth is slower on the less fertile soils.

Christmas trees are grown in some areas of the county. They can grow well on many of the soils but are adversely affected by various soil properties. Managing and harvesting the trees are difficult on steep and very steep soils. Strongly sloping or gently sloping soils are the preferred sites for Christmas trees. The drainage and texture of the soils greatly affect the species that can be successfully grown. For example, blue spruce and Fraser fir do not grow well on poorly drained and somewhat poorly drained soils, such as Melvin, Fitchville, and Orrville soils. Fraser fir also does not grow well on soils that have a fine textured subsoil, such as the Lowell soils. Other factors that affect the species that can be successfully grown are the fertility of the soil, available water capacity, the potential for frost action, and the depth to bedrock. Westmoreland soils are better suited to spruce and fir than the Berks soils because they are naturally more fertile, have a higher available water capacity, and are deeper to bedrock.

Woodland Management and Productivity

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol***,** a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce in a pure stand under natural conditions. The number 1 indicates low potential productivity; 2 or 3, moderate; 4 or 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In the table, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that

seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

Plant competition ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Woodland Harvesting and Regeneration Activities

Table 9 gives the degree and kinds of limitations that affect the operation of equipment used in tree harvesting and in the regeneration of woodland. Ratings are given for haul roads, log landings, skid trails and logging areas, and site preparation and planting. The limitations are considered *slight* if the physical site characteristics impose little or no limitations on the kind of equipment or the time of operation; *moderate* if the site characteristics impose some limitations on the kind of equipment or the time of operation, or both; and *severe* if the site characteristics are such that special equipment or special logging techniques are needed or the time of efficient operation is very limited.

Haul roads are access roads leading from log landings to primary or surfaced roads. Generally, these are unpaved roads that have not been graveled. The ratings are based on soil properties, site features, and observed performance of the soils. Wetness, rockiness, depth to hard bedrock, stoniness, soil strength, slope, soil texture, and flooding should be considered in selecting routes for haul roads. Wetness and flooding affect the duration of use. Rock outcrops, stones, and boulders, which are difficult to move, hinder the construction when cutting and filling are needed. Soil strength, as inferred from the AASHTO group index and AASHTO group, is a measure of the traffic-supporting capacity of the soil. Slope affects the use of equipment and the cutting and filling requirements of the site.

Log landings are areas where logs are assembled for transportation. The best sites for landings require little or no surface preparation, which consists of cutting or filling. Considerable soil compaction can be expected in these areas. The ratings are based on the soil properties, site features, and the observed performance of the soils. Wetness, flooding, rockiness, stoniness, slope, depth to hard bedrock, soil strength, soil texture, and content of rock fragments should be considered in selecting sites for log landings. Wetness and flooding affect the duration of use. Rock outcrops, stones, and boulders, which are difficult to move, limit the use of equipment and affect the configuration and

location of landings. Depth to hard bedrock is a problem where cutting and filling are required. Slope affects the use of equipment and the cutting and filling requirements of the site. Soil texture affects trafficability. Soil strength, as inferred from the AASHTO group index and AASHTO group, is a measure of the traffic-supporting capacity of the soil.

Skid trails and *logging areas* include the areas from the stumps to the log landings that are partially or completely logged with rubber-tired equipment. Other types of log-moving equipment can sometimes be used to minimize or overcome the site limitations. The ratings are based on soil properties, site features, and the observed performance of the soils. Wetness, flooding, rockiness, stoniness, texture, and slope affect the use of logging equipment. Deferring logging activities during periods when the soil is saturated at or near the surface helps to minimize environmental damage. Special equipment is usually required during these periods. Soils that are subject to flooding of long duration should not be logged because logging activities can damage the equipment or the environment, or both. Surface stones, boulders, and rock outcrops limit the safe and efficient use of equipment. As slope gradients increase, traction problems worsen. Traction is a problem on clayey soils during wet periods and on sandy soils during dry periods. Unless frozen, organic soils are severely damaged by the use of rubber-tired or tracked equipment.

Site preparation and *planting* are mechanized operations. The ratings are based on the limitations affecting the efficient use of equipment and on the damage that can result on the site when equipment is used. It is assumed that the operating techniques used do not displace or remove topsoil from the site or create channels in which storm runoff can concentrate. Wetness, flooding, rockiness, stoniness, the content of rock fragments, depth to bedrock, texture, and slope affect the use of site preparation and planting equipment. Deferring site preparation and planting during periods when the soil is saturated at or near the surface helps to minimize environmental damage. Special equipment is usually required during these periods. Equipment should not be used on soils that are subject to flooding of long duration. Operating equipment on these soils can result in equipment damage or environmental damage, or both. Surface stones, boulders, and rock outcrops limit the safe and efficient use of equipment. Rock fragments and hard bedrock at very shallow depths can interfere with the equipment used in site preparation and planting. As slope gradients increase, traction problems worsen. Traction is a problem on clayey soils during wet periods and on sandy soils during dry periods. Organic soils can be severely damaged if rubber-tired or tracked equipment is operated when the soils are not frozen.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly deciduous shrubs and evergreen trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 10 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service, from a commercial nursery, or from the Ohio Department of Natural Resources, Division of Forestry.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also

important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 14 and interpretations for dwellings without basements and for local roads and streets in table 13.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas (fig. 11).

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Mark Battles, game protector supervisor, and Dan McMillen, private lands biologist, Ohio Department of Natural Resources, helped prepare this section.

Harrison County provides habitat for a wide variety of wildlife. The major species of wildlife in the county are deer, ruffed grouse, turkey, crows, rabbits, raccoon, beavers, squirrels, bluebirds, woodducks, owls, woodchucks, red-tailed hawks, fox, and muskrats. This variety of wildlife is supported by many diverse habitats, including openland, woodland, and wetland.

The southeastern part of the county, which includes the townships of Cadiz, Green, Short Creek, and Athens, is dominated by strip mined land. Some of these strip mined areas have been reclaimed. The townships of Franklin, Stock, Washington, Nottingham, and Moorefield include the lakes of Tappan, Clendening, and Piedmont and the associated forest land in the Muskingum Watershed Conservancy District (MWCD). This MWCD land, along with the Harrison State Forest in Archer Township, provides public access areas for hunting, hiking, and other outdoor activities.

The county has a significant amount of forest land across much of the county. Many of these forests include oak, hickory, walnut, and beech trees, which provide the food and shelter for many species of forest wildlife. Scattered groves of conifers provide roosting sites for many species of birds during inclement weather.

Canadice and Melvin soils are the primary hydric soils on bottom land in the county. If properly managed, these wetland areas provide high-quality habitat for many species of wetland wildlife. Pin oak, ash, silky dogwood, gray dogwood, and elm are the primary woody species in the wetlands. Cattails, burreed, rice cutgrass, wild millet, spike rushes, and smartweed are beneficial hydric vegetation growing in the marshes.

Most of the openland areas in the county can be improved for upland wildlife. These areas of

Figure 11.—A graded area of Coshocton silt loam, 15 to 25 percent slopes, used for picnicking.

pastureland, reclaimed strip mines, cropland, and abandoned homesteads can provide nesting and feeding sites for meadowlarks, bluebirds, rabbits, quail, and various songbirds. The cropland and fence rows can provide food for these species of wildlife, and adjacent grasslands can serve as nesting and brooding areas.

Additional information on the abundance and species of wildlife and their associated habitats can be obtained from the local office of the Natural Resources Conservation Service, the local game protector, or the Division of Wildlife District Office.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor (Allan, Garland, and Dugan 1963). A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the

element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are foxtail, goldenrod, ragweed, smartweed, and milkweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and beech. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are raspberry, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, duckweed, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, groundhog, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply

only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 13 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally

limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 14 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 15 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable

source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and

the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

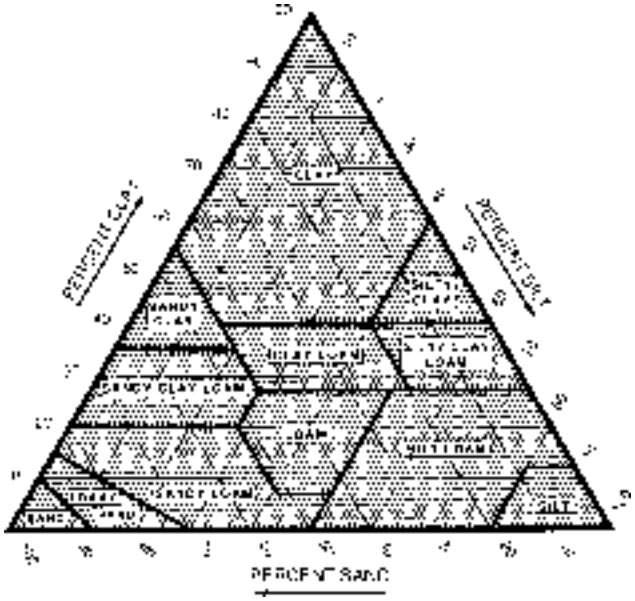

Figure 12.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading “Soil Series and Their Morphology.”

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 12). “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to

those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 18 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For

many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 19 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on

the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Some areas of soils in the county are within the flood pool of lakes in the Muskingum Watershed Conservancy District. These soils are subject to controlled flooding. The approximate flood pool lines are shown on the soil maps, and the detailed soil map units that include small areas within these flood pools are noted in table 19.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

Samples of many of the soils in Harrison County were analyzed by the Soil Characterization Laboratory, Department of Agronomy, Ohio State University, Columbus, Ohio. The data obtained on most samples include those on particle-size distribution, reaction, organic matter content, calcium carbonate equivalent, and extractable cations.

These data were used in the classification and correlation of these soils and in evaluating their behavior under various land uses. Five of the profiles were selected as representative for the respective series and are described in this survey. These series and their laboratory identification numbers are Germano (HR-5), Guernsey (HR-7), Hazleton (HR-3), Morristown (HR-4), and Upshur (HR-6).

In addition to the Harrison County data, data are also available from nearby counties in eastern Ohio. All of these data are on file at the School of Natural Resources, Ohio State University, Columbus, Ohio; the Ohio Department of Natural Resources, Division of Soil and Water Conservation, Columbus, Ohio; and the Natural Resources Conservation Service, State Office, Columbus, Ohio.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (USDA 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA 1975) and in “Keys to Soil Taxonomy” (USDA 1992). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section “Detailed Soil Map Units.”

Aaron Series

Depth class: Deep
Drainage class: Moderately well drained
Permeability: Slow
Parent material: Residuum derived from interbedded limestone, calcareous shale, and siltstone
Landscape position: Ridgetops in the uplands
Slope: 2 to 15 percent

Adjacent soils: Coshocton, Dekalb, Gilpin, Morristown, Westmoreland

Taxonomic class: Fine, mixed, mesic Aquic Hapludalfs

Typical Pedon

Aaron silty clay loam, 6 to 15 percent slopes, eroded; about 1.5 miles southeast of Germano, in German Township; about 1,955 feet east and 2,375 feet north of the southwest corner of sec. 19, T. 11 N., R. 4 W.

Ap—0 to 9 inches; dominantly brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; dark grayish brown (10YR 4/2) in the upper 2 inches; specks of yellowish brown (10YR 5/6) Bt material; moderate medium granular structure; friable; many very fine roots; few rock fragments; strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; firm, plastic and sticky; common very fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; few rock fragments; strongly acid; clear wavy boundary.

Bt2—16 to 23 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct brown (7.5YR 5/4) and few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common very fine roots; common faint clay films on faces of peds; common distinct light brownish gray (2.5Y 6/2) coatings; many fine black (10YR 2/1) segregations of iron and manganese oxide; few rock fragments; medium acid; clear wavy boundary.

Bt3—23 to 30 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few very fine roots; common faint clay films on faces of peds; common distinct light brownish gray coatings; few fine black (10YR 2/1) segregations of iron and manganese oxide; few rock fragments; neutral; clear wavy boundary.

BC—30 to 40 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common faint clay films on faces of peds; about 10 percent rock fragments; slight effervescence; mildly alkaline; clear wavy boundary.

C1—40 to 48 inches; yellowish brown (10YR 5/6) channery silty clay; common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; firm, plastic and sticky; few faint clay films on faces of peds; about 15 percent rock fragments; slight effervescence; mildly alkaline; clear wavy boundary.

C2—48 to 56 inches; grayish brown (2.5Y 5/2) silty clay; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; about 5 percent rock fragments; strong effervescence; moderately alkaline; clear wavy boundary.

Cr—56 to 60 inches; variegated light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/4), olive yellow (2.5Y 6/6), and dusky red (10YR 3/4), soft, calcareous shale bedrock.

Range in Characteristics

Thickness of the solum: 30 to 50 inches
Depth to bedrock: 40 to 60 inches
Content of rock fragments: A and Bt horizons—0 to 14 percent; C horizon—0 to 35 percent

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 2 or 3
Texture—silt loam, silty clay loam

Bt horizon:
Color—hue of 10YR or 2.5Y, value and chroma of 4 to 6
Texture—silty clay loam, silty clay, clay

C horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, chroma of 2 to 6
Texture—silty clay loam, silty clay, or clay in the fine-earth fraction

Berks Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Parent material: Residuum derived from shale, siltstone, and fine grained sandstone bedrock
Landscape position: Ridgetops and side slopes in the uplands
Slope: 6 to 70 percent
Adjacent soils: Coshocton, Gilpin, Guernsey, Westmoreland

Taxonomic class: Loamy-skeletal, mixed, mesic Typic Dystrochrepts

Typical Pedon

Berks channery silt loam, 25 to 40 percent slopes; about 1 mile northwest of Tippecanoe, in Washington Township; about 2,245 feet west and 2,085 feet north of the southeast corner of sec. 29, T. 12 N., R. 7 W.

Oe—1 inch to 0; partially decomposed leaf litter.
A—0 to 3 inches; dark brown (10YR 3/3) channery silt loam, brown (10YR 5/4) dry; weak fine granular structure; friable; many very fine roots; about 20 percent rock fragments; very strongly acid; abrupt smooth boundary.
Bw1—3 to 8 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; common very fine roots; about 30 percent rock fragments; very strongly acid; clear wavy boundary.
Bw2—8 to 18 inches; yellowish brown (10YR 5/4) extremely channery silt loam; weak medium subangular blocky structure; friable; common very fine roots; about 65 percent rock fragments; very strongly acid; clear wavy boundary.
Bw3—18 to 24 inches; yellowish brown (10YR 5/4) extremely channery silt loam; weak fine subangular blocky structure; friable; few very fine roots; about 70 percent rock fragments; very strongly acid; clear wavy boundary.
R—24 to 36 inches; light olive brown (2.5Y 5/4), weathered siltstone bedrock.

Range in Characteristics

Thickness of the solum: 15 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments: A horizon—15 to 30 percent; Bw horizon—25 to 75 percent; C horizon, if it occurs—50 to 90 percent

A horizon:
Color—hue of 10YR, value of 3 to 5, chroma of 2 to 4
Texture—silt loam in the fine-earth fraction

Ap horizon (if it occurs):
Color—hue of 10YR, value of 3 to 5, chroma of 3 or 4
Texture—silt loam in the fine-earth fraction

Bw horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, chroma of 3 to 6
Texture—loam or silt loam in the fine-earth fraction

C horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, chroma of 3 or 4
Texture—loam or silt loam in the fine-earth fraction

Bethesda Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Parent material: Partly weathered fine-earth material mixed with fragments of shale, siltstone, and sandstone from surface mining
Landscape position: Ridgetops, benches, and side slopes in areas of mine spoil
Slope: 0 to 70 percent
Adjacent soils: Aaron, Dekalb, Gilpin, Guernsey, Westmoreland

Taxonomic class: Loamy-skeletal, mixed, acid, mesic Typic Udorthents

Typical Pedon

Bethesda channery silty clay loam, 25 to 70 percent slopes; about 0.25 mile south of Moorefield, in Moorefield Township; 1,135 feet west and 1,930 feet south of the northeast corner of sec. 23, T. 10 N., R. 6 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) channery silty clay loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many fine roots; about 20 percent rock fragments; very strongly acid; abrupt smooth boundary.
C1—4 to 30 inches; brown (10YR 4/3) very channery silty clay loam; massive; friable; common fine roots; about 40 percent rock fragments; very strongly acid; gradual wavy boundary.
C2—30 to 40 inches; very channery silty clay loam, 80 percent variegated brown (10YR 4/3) and 20 percent yellowish brown (10YR 5/4); massive; firm; few fine roots; about 50 percent rock fragments; very strongly acid; gradual wavy boundary.
C3—40 to 50 inches; yellowish brown (10YR 5/4) very channery silty clay loam; massive; firm; few fine roots; about 55 percent rock fragments; very strongly acid; gradual wavy boundary.
C4—50 to 60 inches; extremely channery silty clay loam, 80 percent variegated brown (10YR 4/3) and 20 percent yellowish brown (10YR 5/4); massive; firm; few fine roots; about 60 percent rock fragments; very strongly acid; gradual wavy boundary.
C5—60 to 80 inches; brown (10YR 4/3) extremely channery silty clay loam; massive; firm; about 65 percent rock fragments; very strongly acid.

Range in Characteristics

Depth to bedrock: More than 60 inches
Content of rock fragments: A horizon—15 to 35 percent; C horizon—35 to 70 percent

A horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, chroma of 1 to 4

Texture—silty clay loam in the fine-earth fraction

C horizon:
Color—hue of 7.5YR to 5Y or neutral, value of 3 to 6, chroma of 0 to 6
Texture—clay loam, silty clay loam, silt loam, or loam in the fine-earth fraction

Brookside Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Clayey colluvium
Landscape position: Foot slopes in the uplands
Slope: 15 to 25 percent
Adjacent soils: Lowell, Nolin

Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Brookside silty clay loam, 15 to 25 percent slopes; about 0.5 mile west of Adena, in Short Creek Township; 1,345 feet west and 2,510 feet north of the southeast corner of sec. 1, T. 9 N., R. 4 W.

Ap—0 to 8 inches; dark brown (10YR 3/3) silty clay loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine roots; few rock fragments; slightly acid; abrupt smooth boundary.
Bt1—8 to 15 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; firm; common very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; about 5 percent shale and sandstone fragments; neutral; clear wavy boundary.
Bt2—15 to 25 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; firm; common very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common soft shale and coal fragments; about 5 percent sandstone fragments; neutral; clear wavy boundary.
Bt3—25 to 40 inches; dark yellowish brown (10YR 4/4) silty clay; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; common soft shale and coal fragments; about 10 percent sandstone fragments; neutral; clear wavy boundary.
Bt4—40 to 50 inches; light olive brown (2.5Y 5/4) silty clay; common fine distinct grayish brown (2.5Y 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; common distinct light olive brown (2.5Y 5/4) clay films on faces on peds; common soft shale and coal fragments; about 10 percent sandstone fragments; neutral; clear wavy boundary.
BC—50 to 60 inches; olive brown (2.5Y 4/4) silty clay; common medium distinct light yellowish brown (2.5Y 6/4), grayish brown (2.5Y 5/2), and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few distinct olive brown (2.5Y 4/4) clay films on faces of peds; common soft shale and coal fragments; about 10 percent sandstone fragments; slight effervescence; mildly alkaline; gradual wavy boundary.
C1—60 to 70 inches; olive brown (2.5Y 4/4) channery silty clay; few fine distinct grayish brown (2.5Y 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; common soft shale and coal fragments; about 20 percent sandstone fragments; slight effervescence; mildly alkaline; gradual wavy boundary.
C2—70 to 80 inches; olive brown (2.5Y 4/4) silty clay; common medium distinct light grayish brown (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; massive; firm; common soft shale and coal fragments; about 10 percent sandstone fragments; slight effervescence; mildly alkaline.

Range in Characteristics

Thickness of the solum: 40 to 80 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—2 to 10 percent; Bt horizon—5 to 25 percent; C horizon—5 to 35 percent

Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 or 3
Texture—silty clay loam

Bt horizon:
Color—hue of 10YR, 7.5YR, or 2.5Y; value of 4 or 5; chroma of 3 to 6
Texture—silty clay loam, silty clay, or clay in the fine-earth fraction

C horizon:
Color—hue of 10YR, 7.5YR, or 2.5Y; value of 3 to 5; chroma of 2 to 6
Texture—silty clay loam, silty clay, or clay in the fine-earth fraction

Canadice Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Parent material: Clayey lacustrine deposits
Landscape position: Low terraces along streams
Slope: 0 to 2 percent
Adjacent soils: Caneadea, Glenford, Orrville

Taxonomic class: Fine, illitic, mesic Typic Ochraqualfs

Typical Pedon

Canadice silty clay loam; about 5 miles southwest of Bowerston, in Monroe Township; about 1,955 feet west and 395 feet north of the southeast corner of sec. 18, T. 13 N., R. 7 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; firm; many very fine roots; medium acid; abrupt smooth boundary.

Btg1—7 to 13 inches; dark gray (5Y 4/1) silty clay; common medium distinct grayish brown (2.5Y 5/2) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium angular blocky structure; firm, plastic and sticky; common very fine roots; few distinct very dark gray (5Y 3/1) clay films and silt coatings on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Btg2—13 to 31 inches; dark gray (5Y 4/1) silty clay; common medium prominent strong brown (7.5YR 5/8) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; firm, plastic and sticky; few very fine roots; few distinct dark gray (N 4/0) clay films and silt coatings on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

BCg—31 to 45 inches; dark gray (5Y 4/1) silty clay loam; common medium faint gray (N 5/0) and few medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm, plastic and sticky; common fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Cg1—45 to 53 inches; gray (5Y 5/1) silty clay; common medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; neutral; gradual wavy boundary.

Cg2—53 to 80 inches; gray (5Y 5/1) silty clay; massive; firm; neutral.

Range in Characteristics

Thickness of the solum: 30 to 55 inches
Depth to bedrock: More than 60 inches

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 2
Texture—silty clay loam

Btg horizon:
Color—hue of 10YR to 5Y, value of 4 to 6, chroma of 1 or 2
Texture—silty clay, clay, silty clay loam

Cg horizon:
Color—hue of 10YR to 5Y, value of 5 or 6, chroma of 1 or 2
Texture—silty clay, clay, silty clay loam

Caneadea Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Very slow
Parent material: Clayey lacustrine deposits
Landscape position: Terraces along streams
Slope: 0 to 2 percent
Adjacent soils: Canadice, Glenford, Nolin

Taxonomic class: Fine, illitic, mesic Aeric Ochraqualfs

Typical Pedon

Caneadea silty clay loam, 0 to 2 percent slopes; about 5 miles southwest of Bowerston, in Monroe Township; about 1,370 feet east and 635 feet south of the northwest corner of sec. 11, T. 13 N., R. 7 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; firm; many very fine roots; medium acid; abrupt smooth boundary.

Btg—9 to 15 inches; grayish brown (10YR 5/2) silty clay; many medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm, plastic and sticky; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.

Bt1—15 to 25 inches; yellowish brown (10YR 5/4) silty clay; many distinct grayish brown (10YR 5/2)

coatings on faces of peds; many medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; slightly acid; clear wavy boundary.

Bt2—25 to 35 inches; yellowish brown (10YR 5/4) silty clay; common distinct grayish brown (10YR 5/2) coatings on faces of peds; common medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; neutral; clear wavy boundary.

Bt3—35 to 45 inches; yellowish brown (10YR 5/4) silty clay; common distinct grayish brown (10YR 5/2) coatings on faces of peds; common medium distinct grayish brown (10YR 5/2) and brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few fine roots; many distinct gray (N 6/0) clay films on faces of peds; many fine black (10YR 2/1) concretions of iron and manganese oxide; neutral; clear wavy boundary.

BC—45 to 55 inches; yellowish brown (10YR 5/4) silty clay; common distinct gray (N 6/0) coatings on faces of peds; common medium distinct grayish brown (10YR 5/2) and many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm, plastic and sticky; common distinct gray (N 6/0) clay films on vertical faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; neutral; clear wavy boundary.

C—55 to 80 inches; dark yellowish brown (10YR 4/4) laminated silty clay loam and silty clay; common medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; massive; firm; common fine black (10YR 2/1) concretions of iron and manganese oxide; neutral.

Range in Characteristics

Thickness of the solum: 50 to 60 inches
Depth to bedrock: More than 60 inches

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2 or 3
Texture—silty clay loam

Bt horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, chroma of 2 to 4
Texture—silty clay, clay, silty clay loam

C horizon:
Color—hue of 10YR, 2.5Y, or 5Y or neutral; value of 3 or 4; chroma of 0 to 4
Texture—silty clay, silty clay loam

Coshocton Series

Depth class: Deep or very deep
Drainage class: Moderately well drained
Permeability: Slow or moderately slow
Parent material: Colluvium and residuum derived from shale, siltstone, and sandstone
Landscape position: Benches, ridgetops, foot slopes, and side slopes in the uplands
Slope: 2 to 40 percent
Adjacent soils: Gilpin, Guernsey, Westmoreland, Hazleton, Orrville

Taxonomic class: Fine-loamy, mixed, mesic Aquultic Hapludalfs

Typical Pedon

Coshocton silt loam, 15 to 25 percent slopes; about 5 miles northwest of Cadiz, in Stock Township; 1,510 feet east and 715 feet north of the southwest corner of sec. 25, T. 11 N., R. 5 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; many fine roots; about 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

BE—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common very fine roots; common brown (10YR 5/3) silt coatings on faces of peds; about 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bt1—14 to 20 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common faint clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; about 15 percent rock fragments; very strongly acid; clear wavy boundary.

Bt2—20 to 30 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct light brownish gray (10YR 6/2) and common

medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common faint clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; about 20 percent rock fragments; very strongly acid; clear wavy boundary.

Bt3—30 to 36 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; about 15 percent rock fragments; very strongly acid; clear wavy boundary.

BC—36 to 45 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; common fine black (10YR 2/1) concretions of iron and manganese oxide; about 20 percent rock fragments; very strongly acid; clear wavy boundary.

C1—45 to 51 inches; yellowish brown (10YR 5/4) channery loam; few fine distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; massive; friable; common fine black (10YR 2/1) concretions of iron and manganese oxide; about 25 percent rock fragments; strongly acid; clear wavy boundary.

C2—51 to 60 inches; yellowish brown (10YR 5/4) channery clay loam; massive; firm; 30 percent rock fragments; strongly acid; clear wavy boundary.

C3—60 to 80 inches; yellowish brown (10YR 5/4) very channery clay loam; massive; firm; 40 percent rock fragments; medium acid.

Range in Characteristics

Thickness of the solum: 30 to 50 inches
Depth to bedrock: 40 to 84 inches
Content of rock fragments: Ap horizon—2 to 15 percent; Bt horizon—2 to 15 percent in the upper part, 10 to 35 percent in the lower part; C horizon—20 to 50 percent

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 2 or 3
Texture—silt loam

Bt horizon:
Color—hue of 7.5YR or 10YR in the upper part and 7.5YR or 2.5Y in the lower part, value of 4 or 5, chroma of 4 to 6 in the upper part and 2 to 6 in the lower part
Texture—silty clay loam, silt loam, or clay loam in the upper part and loam to silty clay in the fine-earth fraction in the lower part

C horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 or 5, chroma of 3 to 6
Texture—loam, silty clay loam, silty clay, or clay loam in the fine-earth fraction

Dekalb Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Rapid
Parent material: Residuum derived from sandstone
Landscape position: Side slopes and ridgetops in the uplands
Slope: 6 to 70 percent
Adjacent soils: Gilpin, Westmoreland

Taxonomic class: Loamy-skeletal, mixed, mesic Typic Dystrochrepts

Typical Pedon

Dekalb channery fine sandy loam in an area of Westmoreland-Dekalb complex, 40 to 70 percent slopes; about 1.5 miles northeast of Jewett, in Rumley Township; 1,000 feet west and 25 feet south of the center of sec. 1, T. 12 N., R. 5 W.

Oe—2 inches to 0; partially decomposed leaf litter

A—0 to 4 inches; very dark grayish brown (10YR 3/2) channery fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine roots; about 15 percent rock fragments; very strongly acid; abrupt smooth boundary.

BE—4 to 9 inches; yellowish brown (10YR 5/4) channery fine sandy loam; weak fine subangular blocky structure; very friable; many fine roots; about 20 percent rock fragments; very strongly acid; clear wavy boundary.

Bw1—9 to 15 inches; yellowish brown (10YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable; common fine roots; about 25 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—15 to 22 inches; yellowish brown (10YR 5/6) very channery sandy loam; moderate medium subangular blocky structure; friable; common fine roots; about 35 percent rock fragments; very strongly acid; clear wavy boundary.

BC—22 to 32 inches; yellowish brown (10YR 5/4) very

channery sandy loam; weak medium subangular blocky structure; friable; common fine roots; about 55 percent rock fragments; very strongly acid; clear wavy boundary.
C—32 to 37 inches; yellowish brown (10YR 5/4) extremely channery sandy loam; massive; friable; few fine roots; about 70 percent rock fragments; very strongly acid; clear wavy boundary.
R—37 to 40 inches; light olive brown (2.5Y 5/4) sandstone bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments: A horizon—15 to 30 percent; Bw horizon—15 to 60 percent; C horizon—50 to 90 percent

A horizon:
Color—hue of 10YR, value of 2 or 3, chroma of 1 or 2
Texture—fine sandy loam or loam in the fine-earth fraction

Bw horizon:
Color—hue of 7.5YR or 10YR, value of 5 or 6, chroma of 4 to 6
Texture—loam, fine sandy loam, or sandy loam in the fine-earth fraction

C horizon:
Color—hue of 7.5YR or 10YR, value of 5 or 6, chroma of 4 to 6
Texture—sandy loam or loamy sand in the fine-earth fraction

Fairpoint Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Parent material: Partly weathered fine-earth material mixed with fragments of shale, siltstone, and sandstone from surface mining
Landscape position: Ridgetops, benches, and side slopes in areas of mine spoil
Slope: 0 to 70 percent
Adjacent soils: Berks, Coshocton, Westmoreland

Taxonomic class: Loamy-skeletal, mixed, nonacid, mesic Typic Udorthents

Typical Pedon

Fairpoint silty clay loam, 25 to 40 percent slopes; about 5.5 miles southwest of Bowerston, in Franklin Township; 792 feet east and 1,500 feet north of the southwest corner of sec. 11, T. 13 N., R. 7 W.

Ap—0 to 3 inches; yellowish brown (10YR 5/4) silty clay loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; friable; many fine roots; about 10 percent rock fragments; medium acid; abrupt smooth boundary.
C1—3 to 12 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; many fine roots; about 14 percent rock fragments; medium acid; abrupt smooth boundary.
C2—12 to 25 inches; very channery silty clay loam, 90 percent variegated light olive brown (2.5Y 5/4) and 10 percent gray (N 6/0); massive; firm; about 50 percent rock fragments; slightly acid; gradual wavy boundary.
C3—25 to 45 inches; extremely channery silty clay loam, 80 percent variegated light olive brown (2.5Y 5/4), 10 percent yellowish brown (10YR 5/4), and 10 percent gray (N 6/0); massive; firm; about 65 percent rock fragments; medium acid; gradual wavy boundary.
C4—45 to 55 inches; light olive brown (2.5Y 5/4) extremely channery clay loam; massive; firm; about 60 percent rock fragments; neutral; abrupt smooth boundary.
C5—55 to 80 inches; very channery clay loam, 90 percent variegated very dark gray (N 3/0) and 10 percent light olive brown (2.5Y 5/4); massive; firm; many soft fragments of coal and shale in the lower part; about 50 percent rock fragments; slightly acid.

Range in Characteristics

Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—5 to 14 percent; C horizon—10 to 35 percent in the upper part and 35 to 70 percent in the lower part

Ap horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, chroma of 1 to 4
Texture—silty clay loam

C horizon:
Color—hue of 7.5YR to 2.5Y or neutral, value of 3 to 6, chroma of 0 to 6
Texture—clay loam, silty clay loam, silt loam, or loam in the fine-earth fraction

Fitchville Series

Depth class: Very deep
Drainage class: Somewhat poorly drained

Permeability: Moderately slow
Parent material: Stratified silty lacustrine deposits
Landscape position: Slack-water terraces along streams
Slope: 0 to 6 percent
Adjacent soils: Canadice, Caneadea, Coshocton, Glenford, Nolin, Orrville, Westmoreland

Taxonomic class: Fine-silty, mixed, mesic Aeric Ochraqualfs

Typical Pedon

Fitchville silt loam, 0 to 2 percent slopes; about 1.25 miles west of Piedmont, in Freeport Township; 710 feet south and 1,505 feet west of the northeast corner of sec. 5, T. 11 N., R. 7 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine roots; strongly acid; abrupt smooth boundary.
BE—10 to 16 inches; brown (10YR 5/3) silt loam; many medium distinct grayish brown (10YR 5/2) and common fine distinct reddish brown (5YR 4/4) mottles; weak medium subangular blocky structure; friable; common very fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; strongly acid; clear smooth boundary.
Bt1—16 to 27 inches; yellowish brown (10YR 5/4) silt loam; many distinct light brownish gray (10YR 6/2) coatings on faces of peds; many medium distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.
Bt2—27 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; many distinct light brownish gray (10YR 6/2) coatings on faces of peds; common medium distinct light grayish brown (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.
Bt3—40 to 50 inches; yellowish brown (10YR 5/4) silt loam; common distinct light brownish gray (10YR 6/2) coatings on faces of peds; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.
C1—50 to 70 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; massive; friable; common fine black (10YR 2/1) concretions of iron and manganese oxide; slightly acid; gradual wavy boundary.
C2—70 to 80 inches; yellowish brown (10YR 5/6) stratified silt loam, loam, and silty clay loam; common medium distinct gray (N 6/0) mottles; massive; friable; common fine black (10YR 2/1) concretions of iron and manganese oxide; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2
Texture—silt loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, chroma of 1 to 6
Texture—silt loam, silty clay loam, thin subhorizons of loam

C horizon:
Color—hue of 10YR, value of 4 to 6, chroma of 2 to 6
Texture—silt loam, loam, silty clay loam

Germano Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Residuum derived from weakly cemented sandstone
Landscape position: Ridgetops and side slopes in the uplands
Slope: 6 to 25 percent
Adjacent soils: Coshocton, Gilpin, Hazleton, Rigley, Westmoreland

Taxonomic class: Coarse-loamy, mixed, mesic Typic Hapludults

Typical Pedon

Germano fine sandy loam, 6 to 15 percent slopes; about 0.1 mile north of New Rumley, in Rumley

Township; 2,165 feet west and 2,480 feet north of the southeast corner of sec. 14, T. 12 N., R. 5 W.

Ap—0 to 10 inches; brown (10YR 4/3) fine sandy loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; friable; many fine roots; about 5 percent sandstone fragments; slightly acid; abrupt smooth boundary.
Bt1—10 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 5/4) clay films on faces of peds; common soft fragments; about 10 percent sandstone fragments; medium acid; clear wavy boundary.
Bt2—18 to 26 inches; yellowish brown (10YR 5/4) channery fine sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 5/4) clay films on faces of peds; common soft fragments; about 15 percent sandstone fragments; strongly acid; clear wavy boundary.
C—26 to 33 inches; yellowish brown (10YR 5/4) very channery fine sandy loam; massive; friable; few fine roots; common soft fragments; about 45 percent sandstone fragments; very strongly acid; clear wavy boundary.
Cr—33 to 37 inches; light yellowish brown (10YR 6/4), fractured, weathered sandstone bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments: Ap horizon—5 to 15 percent; Bt horizon—5 to 35 percent; C horizon—20 to 75 percent

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 3 or 4
Texture—fine sandy loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value and chroma of 4 to 6
Texture—loam, sandy loam, or fine sandy loam in the fine-earth fraction

C horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, chroma of 4 to 6
Texture—sandy loam or fine sandy loam in the fine-earth fraction

Gilpin Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Colluvium and residuum derived from interbedded acid siltstone, shale, and sandstone
Landscape position: Ridgetops and side slopes in the uplands
Slope: 2 to 25 percent
Adjacent soils: Coshocton, Dekalb, Hazleton, Westmoreland

Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludults

Typical Pedon

Gilpin silt loam, 6 to 15 percent slopes; about 2.5 miles west of Jewett, in Rumley Township; 1,505 feet west and 370 feet north of the southeast corner of sec. 24, T. 11 N., R. 5 W.

Oe—1 inch to 0; partially decomposed leaf litter.
Ap1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many very fine roots; about 5 percent shale fragments; very strongly acid; abrupt smooth boundary.
Ap2—2 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium and fine granular structure; friable; many very fine roots; about 5 percent shale fragments; very strongly acid; abrupt smooth boundary.
Bt1—6 to 13 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common very fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; about 5 percent shale fragments; strongly acid; clear wavy boundary.
Bt2—13 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; about 10 percent shale fragments; strongly acid; clear wavy boundary.
Bt3—18 to 24 inches; yellowish brown (10YR 5/4) channery silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; few distinct brown (7.5YR 5/4) clay films on faces of peds; about 25 percent shale fragments; strongly acid; clear wavy boundary.
BC—24 to 30 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium subangular blocky structure; friable; few very fine roots; few distinct brown (7.5YR 5/4) coatings on faces of peds; about 35 percent shale fragments; strongly acid; gradual wavy boundary.
R—30 to 35 inches; light olive brown (2.5Y 5/4) shale bedrock.

Range in Characteristics

Thickness of the solum: 20 to 36 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments: Ap horizon—5 to 10 percent; Bt horizon—5 to 40 percent; C horizon (if it occurs)—30 to 60 percent

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 or 3
Texture—silt loam

Bt horizon:
Color—hue of 7.5YR or 10YR, value of 4 or 5, chroma of 4 to 6
Texture—silt loam, loam, silty clay loam, or clay loam in the fine-earth fraction

C horizon (if it occurs):
Color—hue of 7.5YR to 2.5Y, value of 4 or 5, chroma of 2 to 6
Texture—silt loam, loam, or silty clay loam in the fine-earth fraction

Glenford Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Parent material: Stratified silty lacustrine deposits
Landscape position: Slack-water terraces along streams
Slope: 2 to 15 percent
Adjacent soils: Canadice, Caneadea, Coshocton, Fitchville, Orrville, Westmoreland

Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Glenford silt loam, 2 to 6 percent slopes; about 1 mile north of Tippecanoe, in Washington Township; 1,055 feet west and 185 feet south of the northeast corner of sec. 23, T. 12 N., R. 7 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine roots; neutral; abrupt smooth boundary.
Bt1—10 to 17 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common very fine roots; few faint clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; brown (10YR 4/3) organic coatings on linings of root channels; medium acid; clear wavy boundary.
Bt2—17 to 25 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; very strongly acid; clear wavy boundary.
Bt3—25 to 33 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; common distinct pale brown (10YR 6/3) silt coatings on faces of peds; common fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
Bt4—33 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common distinct yellowish brown (10YR 5/4) and light brownish gray (10YR 6/2) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
BC—45 to 57 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.
C—57 to 80 inches; brown (10YR 5/3) silt loam; many medium distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine black (10YR 2/1) concretions of iron and manganese oxide; slightly acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 2 or 3
Texture—silt loam

Bt horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 3 to 6
Texture—silt loam, silty clay loam

C horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 3 to 6
Texture—silt loam, silty clay loam, thin strata of loam or fine sandy loam

Guernsey Series

Depth class: Deep or very deep
Drainage class: Moderately well drained
Permeability: Slow or moderately slow
Parent material: Colluvium and residuum derived from interbedded shale, siltstone, and limestone
Landscape position: Side slopes and benches in the uplands
Slope: 6 to 40 percent
Adjacent soils: Berks, Dekalb, Gilpin, Upshur, Westmoreland

Taxonomic class: Fine, mixed, mesic Aquic Hapludalfs

Typical Pedon

Guernsey silty clay loam, 15 to 25 percent slopes, eroded; about 2 miles southwest of Jewett, in Archer Township; 1,005 feet south and 1,900 feet west of the northeast corner of sec. 16, T. 12 N., R. 5 W.

Ap—0 to 9 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; specks of yellowish brown (10YR 5/4) material from the subsoil; moderate medium granular structure; friable; many very fine roots; about 5 percent rock fragments; medium acid; abrupt smooth boundary.
Bt1—9 to 15 inches; yellowish brown (10YR 5/4) silty clay; moderate medium subangular blocky structure; firm; common very fine roots; common distinct clay films on faces of peds; about 5 percent rock fragments; very strongly acid; clear wavy boundary.
Bt2—15 to 22 inches; yellowish brown (10YR 5/4) clay; common medium distinct light brownish gray (2.5Y 6/2) and brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common very fine roots; common distinct clay films on faces of peds; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; about 5 percent rock fragments; very strongly acid; clear wavy boundary.
2Bt3—22 to 32 inches; light olive brown (2.5Y 5/4) silty clay; common medium distinct light brownish gray (2.5Y 6/2) and few medium distinct brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few fine roots; common distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; few rock fragments; strongly acid; clear wavy boundary.
2Bt4—32 to 40 inches; light olive brown (2.5Y 5/4) silty clay; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; firm, plastic and sticky; few fine roots; few distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; few rock fragments; slightly acid; clear wavy boundary.
2C1—40 to 48 inches; strong brown (7.5YR 5/6) silty clay; common medium distinct light brownish gray (2.5Y 6/2) and light olive brown (2.5Y 5/4) mottles; massive; firm; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; few rock fragments; slightly acid; clear wavy boundary.
2C2—48 to 52 inches; light yellowish brown (2.5Y 6/4) silty clay; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; massive; firm; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; about 5 percent rock fragments; slightly acid; clear wavy boundary.
2C3—52 to 80 inches; brown (7.5YR 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/8) and light brownish gray (2.5Y 6/2) mottles; massive; firm; common fine dark brown (7.5YR 3/2) segregations of iron and manganese oxide; about 10 percent rock fragments; slightly acid; abrupt smooth boundary.
2Cr—80 to 83 inches; brown (7.5YR 4/4), soft shale bedrock.

Range in Characteristics

Thickness of the solum: 32 to 60 inches
Depth to bedrock: More than 50 inches
Content of rock fragments: Ap horizon—2 to 10 percent; Bt and 2Bt horizons—2 to 20 percent; 2C horizon—2 to 35 percent

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2 or 3
Texture—silt loam, silty clay loam

Bt and 2Bt horizons:
Color—hue of 7.5YR to 2.5Y with thin subhorizons of 5YR in the lower part; value of 4 to 6; chroma of 3 to 6

Texture—silty clay loam, silty clay, clay, or silt loam in the fine-earth fraction

2C horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 to 6, chroma of 3 to 6
Texture—clay, silty clay, or silty clay loam in the fine-earth fraction

Hazleton Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Rapid or moderately rapid
Parent material: Colluvium and residuum derived from sandstone
Landscape position: Side slopes and ridgetops
Slope: 15 to 70 percent
Adjacent soils: Coshocton, Gilpin, Westmoreland

Taxonomic class: Loamy-skeletal, mixed, mesic Typic Dystrochrepts

Typical Pedon

Hazleton channery sandy loam, 40 to 70 percent slopes; about 0.5 mile east of Scio, in North Township; 2,295 feet east and 895 feet south of the northwest corner of sec. 25, T. 12 N., R. 5 W.

Oe—1 inch to 0; partially decomposed leaf litter.
A—0 to 3 inches; very dark grayish brown (10YR 3/2) channery sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; about 15 percent rock fragments; very strongly acid; abrupt smooth boundary.
BA—3 to 8 inches; yellowish brown (10YR 5/4) channery sandy loam; very dark grayish brown (10YR 3/2) fillings in root channels; weak medium subangular blocky structure; friable; common very fine roots; about 20 percent rock fragments; very strongly acid; clear wavy boundary.
Bw1—8 to 14 inches; yellowish brown (10YR 5/6) channery sandy loam; moderate medium subangular blocky structure; friable; common very fine roots; few faint silt coatings on faces of peds; about 20 percent rock fragments; very strongly acid; clear wavy boundary.
Bw2—14 to 23 inches; yellowish brown (10YR 5/4) very channery sandy loam; moderate medium subangular blocky structure; friable; common very fine roots; few faint silt coatings on faces of peds; about 40 percent rock fragments; very strongly acid; clear wavy boundary.
Bw3—23 to 34 inches; yellowish brown (10YR 5/4) very channery sandy loam; weak medium subangular blocky structure; friable; few very fine roots; few faint silt coatings on faces of peds; about 55 percent rock fragments; very strongly acid; clear wavy boundary.
C—34 to 66 inches; yellowish brown (10YR 5/4) extremely channery loamy sand; massive; very friable; few very fine roots; about 70 percent rock fragments; very strongly acid; clear wavy boundary.
R—66 to 68 inches; sandstone bedrock.

Range in Characteristics

Thickness of the solum: 25 to 50 inches
Depth to bedrock: More than 40 inches
Content of rock fragments: A horizon—15 to 25 percent; Bw horizon—10 to 40 percent in the upper part, 35 to 70 percent in the lower part; C horizon—35 to 80 percent

A or Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 or 3
Texture—sandy loam in the fine-earth fraction

Bw horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 4 to 6
Texture—loam or sandy loam in the fine-earth fraction

C horizon:
Color—hue of 7.5YR or 10YR, value and chroma of 4 to 6
Texture—loam, sandy loam, or loamy sand in the fine-earth fraction

Keene Series

Depth class: Deep or very deep
Drainage class: Moderately well drained
Permeability: Slow or moderately slow
Parent material: Silty material and the underlying residuum derived from shale and siltstone
Landscape position: Ridgetops and beaches in the uplands
Slope: 2 to 6 percent
Adjacent soils: Coshocton, Gilpin

Taxonomic class: Fine-silty, mixed, mesic Aquic Hapludalfs

Typical Pedon

Keene silt loam, 2 to 6 percent slopes; about 0.75 mile north of Hopedale, in Green Township; 1,585 feet west and 2,455 feet north of the southeast corner of sec. 10, T. 9 N., R. 4 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; specks of yellowish brown (10YR 5/6) material from the subsoil; moderate medium granular structure; friable; many very fine roots; strongly acid; abrupt smooth boundary.
BE—10 to 15 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common very fine roots; few faint yellowish brown (10YR 5/4) coatings on faces of peds; strongly acid; clear wavy boundary.
Bt1—15 to 22 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; common faint clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
Bt2—22 to 30 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint clay films on faces of peds; common distinct light brownish gray (10YR 6/2) coatings; few fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
2Bt3—30 to 35 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct gray (10YR 5/1) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
2Bt4—35 to 50 inches; dark grayish brown (10YR 4/2) silty clay; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; common distinct gray (N 5/0) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.
2C1—50 to 60 inches; dark yellowish brown (10YR 4/4) silty clay; few medium distinct light brownish gray (10YR 6/2) mottles; massive; firm; few fine black (10YR 2/1) concretions of iron and manganese oxide; few rock fragments; neutral; gradual wavy boundary.
2C2—60 to 70 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; massive; firm; few fine black (10YR 2/1) concretions of iron and manganese oxide; few rock fragments; neutral; gradual wavy boundary.
2C3—70 to 80 inches; dark yellowish brown (10YR 4/4) silty clay; common medium distinct brownish yellow (10YR 6/6) and dark gray (10YR 4/1) mottles; massive; firm; few fine black (10YR 2/1) concretions of iron and manganese oxide; 5 percent rock fragments; neutral.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Depth to bedrock: 40 to 84 inches
Content of rock fragments: Ap and Bt horizons—0 to 5 percent; 2Bt horizon—0 to 15 percent; C horizon—0 to 25 percent

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2 or 3
Texture—silt loam

Bt horizon:
Color—hue of 7.5YR or 10YR, value of 5, chroma of 4 to 6
Texture—silt loam, silty clay loam

2Bt horizon:
Color—hue of 7.5YR or 10YR, value of 4 to 6, chroma of 1 to 6
Texture—silty clay loam, silty clay

2C horizon:
Color—hue of 10YR or 2.5Y, value of 4 or 5, chroma of 1 to 4
Texture—silty clay loam or silty clay in the fine-earth fraction

Lowell Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderately slow
Parent material: Colluvium and residuum derived from limestone and interbedded limestone, shale, and siltstone
Landscape position: Ridgetops and side slopes in the uplands
Slope: 6 to 40 percent
Adjacent soils: Gilpin, Guernsey, Morristown, Westmoreland

Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Lowell silty clay loam, 15 to 25 percent slopes, eroded; about 1 mile southwest of Adena, in Short Creek Township; 2,220 feet east and 370 feet south of the

northwest corner of sec. 6, T. 8 N., R. 4 W.

Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; specks of yellowish brown (10YR 5/4) material from the subsoil; moderate medium and fine granular structure; friable; many very fine roots; about 5 percent rock fragments; strongly acid; abrupt smooth boundary.

BA—6 to 10 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium subangular blocky structure; friable; common very fine roots; brown (10YR 4/3) fillings in worm channels and coatings on faces of peds; about 5 percent rock fragments; strongly acid; clear wavy boundary.

Bt1—10 to 20 inches; yellowish brown (10YR 5/4) silty clay; moderate medium subangular blocky structure; firm; common very fine roots; common faint clay films on faces of peds; about 5 percent rock fragments; strongly acid; clear wavy boundary.

Bt2—20 to 25 inches; yellowish brown (10YR 5/4) silty clay; moderate medium subangular blocky structure; firm; few very fine roots; common faint clay films on faces of peds; about 10 percent rock fragments; strongly acid; clear wavy boundary.

Bt3—25 to 32 inches; yellowish brown (10YR 5/4) silty clay; moderate medium subangular blocky structure; firm; few very fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; common medium grayish brown (2.5Y 5/2) and dark reddish brown (2.5YR 3/4), weathered remnants of shale; about 10 percent rock fragments; strongly acid; clear wavy boundary.

Bt4—32 to 42 inches; yellowish brown (10YR 5/4) silty clay; moderate medium subangular blocky structure; firm; common distinct brown (7.5YR 5/4) clay films on faces of peds; common medium olive gray (5Y 5/2), weathered remnants of shale; about 5 percent rock fragments; slightly acid; clear wavy boundary.

BC—42 to 48 inches; yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; firm; common distinct brown (7.5YR 5/4) clay films on vertical faces of peds; many medium olive gray (5Y 5/2), weathered shale fragments; about 10 percent rock fragments; strong effervescence; mildly alkaline; clear wavy boundary.

C1—48 to 56 inches; yellowish brown (10YR 5/4) clay; weak medium subangular blocky structure; firm; many medium olive gray (5Y 5/2), weathered shale fragments; about 10 percent rock fragments; strong effervescence; moderately alkaline; clear wavy boundary.

C2—56 to 64 inches; light yellowish brown (2.5Y 6/4) channery silty clay; massive; firm; about 20 percent rock fragments; strong effervescence; moderately alkaline; abrupt smooth boundary.

R—64 to 66 inches; hard limestone bedrock.

Range in Characteristics

Thickness of the solum: 30 to 60 inches
Depth to bedrock: More than 40 inches
Content of rock fragments: Ap horizon—0 to 5 percent; Bt horizon—0 to 5 percent in the upper part, 0 to 15 in the lower part; C horizon—5 to 50 percent

Ap horizon:
- Color—hue of 10YR, value of 4 or 5, chroma of 2 to 4
- Texture—silt loam, silty clay loam

A horizon (if it occurs):
- Color—hue of 10YR, value of 4 or 5, chroma of 2 to 4
- Texture—silt loam, silty clay loam

Bt horizon:
- Color—hue of 7.5YR or 10YR in the upper part, 7.5YR, 10YR, or 2.5Y in the lower part; value of 4 or 5; chroma of 4 to 6
- Texture—silty clay loam or silty clay in the upper part, silty clay or clay in the lower part

C horizon:
- Color—hue of 10YR or 2.5Y, value and chroma of 4 to 6
- Texture—silty clay or clay in the fine-earth fraction

Melvin Series

Depth class: Deep or very deep
Drainage class: Poorly drained
Permeability: Moderate
Parent material: Mixed, medium textured alluvium
Landscape position: Flood plains
Slope: 0 to 2 percent
Adjacent soils: Coshocton, Glenford, Hazleton, Morristown, Westmoreland

Taxonomic class: Fine-silty, mixed, nonacid, mesic Typic Fluvaquents

Typical Pedon

Melvin silt loam, ponded; about 3 miles northeast of Deersville, in Stock Township; 975 feet east and 1,135 feet south of the northwest corner of sec. 9, T. 12 N., R. 6 W.

Ap—0 to 6 inches; gray (10YR 5/1) silt loam, light brownish gray (10YR 6/2) dry; common medium distinct strong brown (7.5YR 5/6) discolorations along root channels; weak fine granular structure;

friable; many fine roots; medium acid; abrupt smooth boundary.
Bg1—6 to 14 inches; gray (5Y 5/1) silt loam; common medium distinct reddish brown (5YR 4/4) discolorations along root channels; weak medium subangular blocky structure; friable; few fine roots; medium acid; clear wavy boundary.
Bg2—14 to 24 inches; gray (5Y 5/1) silt loam; weak medium subangular blocky structure; friable; slightly acid; clear wavy boundary.
Cg1—24 to 40 inches; grayish brown (2.5Y 5/2) silt loam; weak medium subangular blocky structure; friable; slightly acid; clear wavy boundary.
Cg2—40 to 50 inches; gray (N 5/0) loam; few medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; slightly acid; clear wavy boundary.
Cg3—50 to 80 inches; gray (N 5/0) stratified silt loam to loamy sand; many medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; slightly acid.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: A and Bg horizons—0 to 5 percent; Cg horizon—0 to 5 percent above a depth of 30 inches, 0 to 15 percent below a depth of 30 inches

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 1 or 2
Texture—silt loam

A horizon (if it occurs):
Color—hue of 10YR, value of 2 or 3, chroma of 1 or 2
Texture—silt loam

Bg horizon:
Color—hue of 2.5Y or 5Y or neutral, value of 4 to 6, chroma of 0 to 2
Texture—silt loam, silty clay loam

Cg horizon:
Color—hue of 2.5Y or 5Y or neutral, value of 4 to 6, chroma of 0 to 2
Texture—silt loam, silty clay loam, stratified silt loam to loamy sand below a depth of 40 inches

Morristown Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Parent material: Calcareous, partly weathered fine-earth material and fragments of limestone and shale from surface mining operations
Landscape position: Side slopes, ridgetops, and benches in areas of mine spoil
Slope: 0 to 70
Adjacent soils: Aaron, Gilpin, Guernsey, Lowell, Westmoreland

Taxonomic class: Loamy-skeletal, mixed (calcareous), mesic Typic Udorthents

Typical Pedon

Morristown channery silt loam, 25 to 70 percent slopes, bouldery; about 1 mile southwest of Cadiz, in Cadiz Township; 1,320 feet west and 2,615 feet south of the northeast corner of sec. 10, T. 10 N., R. 5 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) channery silt loam, light brownish gray (10YR 6/2) dry; weak medium granular blocky structure; friable; many very fine roots; about 25 percent rock fragments; strong effervescence; mildly alkaline; abrupt smooth boundary.
C1—5 to 16 inches; very channery silt loam, 60 percent variegated dark grayish brown (10YR 4/2) and 40 percent yellowish brown (10YR 5/4); massive; firm; common fine roots; about 40 percent rock fragments; strong effervescence; mildly alkaline; clear wavy boundary.
C2—16 to 24 inches; very channery silt loam, 90 percent variegated dark grayish brown (10YR 4/2) and 10 percent yellowish brown (10YR 5/6); massive; firm; few fine roots; about 50 percent rock fragments; strong effervescence; mildly alkaline; clear wavy boundary.
C3—24 to 80 inches; very channery silt loam, 80 percent variegated brown (10YR 4/3), 10 percent gray (10YR 6/1), and 10 percent yellowish brown (10YR 5/6); massive; firm; few fine roots; about 45 percent rock fragments; strong effervescence; mildly alkaline.

Range in Characteristics

Depth to bedrock: More than 60 inches
Content of rock fragments: A horizon—15 to 35 percent; Ap horizon—5 to 15 percent; C horizon—5 to 35 percent in the upper part, 35 to 70 percent in the lower part

A horizon:
Color—hue of 10YR or 2.5Y, value of 4 to 6, chroma of 2 to 4
Texture—silt loam or silty clay loam in the fine-earth fraction

Ap horizon (if it occurs):
Color—hue of 10YR or 2.5Y, value of 4 to 6, chroma of 2 to 4
Texture—silt loam, silty clay loam

C horizon:
Color—hue of 10YR to 5Y or neutral, value of 4 to 6, chroma of 0 to 6
Texture—silt loam, silty clay loam, or clay loam in the fine-earth fraction

Nolin Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Alluvium
Landscape position: Flood plains
Slope: 0 to 2 percent
Adjacent soils: Caneadea, Coshocton, Glenford, Westmoreland

Taxonomic class: Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Nolin silt loam, occasionally flooded; about 4 miles southeast of Deersville, in Nottingham Township; 1,450 feet west and 130 feet north of the southeast corner of sec. 10, T. 11 N., R. 6 W.

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many very fine roots; neutral; abrupt smooth boundary.
Bw1—11 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular block structure; friable; common very fine roots; common distinct brown (10YR 4/3) organic coatings on faces of peds and on linings of root channels; neutral; clear smooth boundary.
Bw2—20 to 30 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common very fine roots; neutral; gradual wavy boundary.
Bw3—30 to 40 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.
BC—40 to 50 inches; dark yellowish brown (10YR 4/4) loam; few fine distinct light brownish gray (10YR 4/2) and strong brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.
C—50 to 80 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct dark brown (10YR 3/3) and light brownish gray (10YR 6/2) mottles; massive; friable; neutral.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap and Bw horizons—0 to 5 percent; C horizon—0 to 15 percent

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2 or 3
Texture—silt loam

Bw horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 3 or 4
Texture—silt loam, silty clay loam

C horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 2 to 4
Texture—silt loam, silty clay loam, loam, sandy loam, fine sandy loam, or stratified layers of those textures

Omulga Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderate above the fragipan and slow in the fragipan
Parent material: Loess, colluvium, old alluvium, and, in some areas, the underlying lacustrine deposits
Landscape position: Terraces and valley fills
Slope: 2 to 15 percent
Adjacent soils: Berks, Fitchville, Gilpin, Guernsey, Nolin

Taxonomic class: Fine-silty, mixed, mesic Typic Fragiudalfs

Typical Pedon

Omulga silt loam, 6 to 15 percent slopes; about 3 miles southeast of Cadiz, in Short Creek Township; about 1,425 feet west and 1,190 feet north of the southeast corner of sec. 27, T. 9 N., R. 4 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium and fine granular structure; friable; common very fine roots; few specks of yellowish brown (10YR 5/4) material from the B horizon; neutral; abrupt smooth boundary.
Bt1—9 to 15 inches; yellowish brown (10YR 5/4) silt

loam; weak medium subangular blocky structure; friable; common very fine roots; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few distinct light yellowish brown (10YR 6/4) silt coatings on faces of peds; brown (10YR 4/3) organic coatings on linings of root channels; slightly acid; clear wavy boundary.

Bt2—15 to 23 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine black (10YR 2/1) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Bt3—23 to 26 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; many brown (10YR 5/3) silt coatings on faces of peds; medium acid; clear wavy boundary.

Btx—26 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; few fine roots on faces of prisms; common distinct brown (10YR 5/3) clay films on faces of peds; distinct light brownish gray (10YR 6/2) silt coatings along faces of prisms; common fine very dark grayish brown (10YR 3/2) concretions of iron and manganese oxide; few rock fragments; very strongly acid; clear wavy boundary.

2B't1—40 to 47 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; many medium black (10YR 2/1) concretions of iron and manganese oxide; 10 percent rock fragments; very strongly acid; clear wavy boundary.

2B't2—47 to 55 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; common medium black (10YR 2/1) concretions of iron and manganese oxide; 5 percent rock fragments; very strongly acid; clear wavy boundary.

2B't3—55 to 70 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common distinct brown (7.5YR 5/4) clay films on faces of peds; few fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; 5 percent rock fragments; strongly acid; clear wavy boundary.

2C—70 to 80 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; massive; firm; few distinct clay films on faces of peds; common fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; 10 percent rock fragments; strongly acid.

Range in Characteristics

Thickness of the solum: 40 to 80 inches
Depth to bedrock: More than 60 inches
Depth to fragipan: 20 to 36 inches
Content of rock fragments: Ap and Bt horizons—0 to 5 percent; Btx and 2B't horizons—0 to 10 percent; 2C horizon—0 to 15 percent

Ap horizon:
Color—hue of 10YR, value of 4 or 5, chroma of 2 or 3
Texture—silt loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 3 to 8
Texture—silt loam, silty clay loam

Btx horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, chroma of 3 to 6
Texture—silt loam, silty clay loam

2B't horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, chroma of 2 to 6
Texture—loam, silt loam, silty clay loam, clay loam, silty clay

2C horizon:
Color—hue of 10YR or 7.5YR, value of 4 to 6, chroma of 2 to 6
Texture—loam, silt loam, silty clay loam, clay loam, silty clay

Orrville Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Parent material: Alluvium
Landscape position: Flood plains
Slope: 0 to 2 percent
Adjacent soils: Caneadea, Coshocton, Glenford, Gilpin, Hazleton, Westmoreland

Taxonomic class: Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents

Typical Pedon

Orrville silt loam, occasionally flooded; about 0.5 mile north of New Rumley, in Rumley Township; 2,560 feet east and 395 feet south of the northwest corner of sec. 14, T. 12 N., R. 5 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium and fine granular structure; friable; many fine roots; few rock fragments; neutral; abrupt smooth boundary.

Bw—10 to 19 inches; brown (10YR 5/3) silt loam; common medium distinct grayish brown (10YR 5/2) and brown (7.5YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine roots; few rock fragments; slightly acid; clear wavy boundary.

Bg1—19 to 25 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct gray (N 5/0) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few rock fragments; slightly acid; clear wavy boundary.

Bg2—25 to 31 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; about 5 percent rock fragments; slightly acid; clear wavy boundary.

Cg—31 to 40 inches; grayish brown (10YR 5/2) sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; about 5 percent rock fragments; slightly acid; clear wavy boundary.

C—40 to 50 inches; yellowish brown (10YR 5/4) sandy loam; many medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; about 5 percent rock fragments; slightly acid; clear wavy boundary.

Cg1—50 to 65 inches; dark gray (5Y 4/1) sandy loam; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; friable; about 5 percent rock fragments; strongly acid; clear wavy boundary.

Cg2—65 to 80 inches; gray (5Y 5/1) gravelly sandy loam; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; friable; about 15 percent rock fragments; strongly acid.

Range in Characteristics

Thickness of the solum: 24 to 40 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—0 to 5 percent; B horizon—0 to 15 percent; C horizon—0 to 25 percent

Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2
Texture—silt loam

B horizon:
Color—hue of 10YR, value of 4 to 6, chroma of 2 to 4
Texture—silt loam, silty clay loam, loam, or thin subhorizons of sandy loam

C horizon:
Color—hue of 10YR to 5Y, value of 4 or 5, chroma of 1 to 4
Texture—silt loam, loam, or sandy loam in the fine-earth fraction; thin strata of silty clay loam or loamy sand in some pedons

Oshtemo Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Loamy and sandy sediments
Landscape position: Stream terraces
Slope: 2 to 6 percent
Adjacent soils: Coshocton, Glenford, Tioga

Taxonomic class: Coarse-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Oshtemo loam, 2 to 6 percent slopes; about 2 miles east of Bowerston, in North Township; about 950 feet east and 2,430 feet north of the southwest corner of sec. 15, T. 13 N., R. 6 W.

Ap—0 to 10 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak medium and fine granular structure; very friable; many very fine roots; few rock fragments; strongly acid; abrupt smooth boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; common very fine roots; few distinct yellowish brown (10YR 5/6) clay films bridging sand grains; few rock fragments; strongly acid; clear wavy boundary.

Bt2—18 to 30 inches; yellowish brown (10YR 5/6) sandy loam; moderate medium subangular blocky structure; friable; common very fine roots; common distinct strong brown (7.5YR 5/6) clay films bridging sand grains; few rock fragments; strongly acid; clear wavy boundary.

BC—30 to 40 inches; yellowish brown (10YR 5/4) loamy sand; strong brown (7.5YR 5/6) discontinuous bands of sandy loam; single grained; loose; few rock fragments; strongly acid; clear wavy boundary.
C—40 to 80 inches; yellowish brown (10YR 5/4), stratified sandy loam and loamy sand; massive; very friable; thin strata of fine sandy loam; few rock fragments; strongly acid.

Range in Characteristics

Thickness of the solum: 40 to 60 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—1 to 10 percent; B horizon—1 to 20 percent; C horizon—1 to 30 percent

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 2 or 3
Texture—loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 3 to 6
Texture—sandy loam or sandy clay loam in the fine-earth fraction

C horizon:
Color—hue of 10YR, value of 5 or 6, chroma of 2 to 4
Texture—sand, loamy sand, or sandy loam in the fine-earth fraction.

Peoga Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Slow
Parent material: Silty lacustrine deposits
Landscape position: Low terraces along streams
Slope: 0 to 2 percent
Adjacent soils: Glenford, Oshtemo, Tioga

Taxonomic class: Fine-silty, mixed, mesic Typic Ochraqualfs

Typical Pedon

Peoga silt loam, rarely flooded; about 0.5 mile northeast of Bowerston, in Monroe Township; about 555 feet east and 320 feet south of the northwest corner of sec. 27, T. 13 N., R. 6 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many very fine roots; strongly acid; abrupt smooth boundary.
Btg1—10 to 16 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; firm; common very fine roots; few distinct grayish brown (10YR 5/2) silt coatings on faces of peds; few fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
Btg2—16 to 22 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and few medium distinct yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.
Btg3—22 to 30 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/4) and common medium prominent yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt1—30 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and common medium distinct yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct grayish brown (10YR 5/2) clay films on faces of peds; many distinct light brownish gray (10YR 6/2) coatings on faces of peds; common fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
Bt2—40 to 50 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light grayish brown (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; many light brownish gray (10YR 6/2) coatings on faces of peds; common fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; strongly acid; clear wavy boundary.
BC—50 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light grayish

brown (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; firm; common distinct light brownish gray (10YR 6/2) clay films on faces of peds; many light grayish brown (10YR 6/2) coatings on faces of peds; many fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Cg1—60 to 70 inches; gray (10YR 6/1) silty clay loam; common medium distinct brown (7.5YR 5/4) mottles; massive; firm; gray (N 6/0) vertical seams; common fine dark brown (7.5YR 3/2) concretions of iron and manganese oxide; medium acid; clear wavy boundary.

Cg2—70 to 80 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/4) and few fine distinct yellowish red (5YR 4/6) mottles; massive; firm; slightly acid.

Range in Characteristics

Thickness of the solum: 48 to 72 inches
Depth to bedrock: More than 60 inches

Ap horizon:
Color—hue of 10YR, value of 4, chroma of 1 or 2
Texture—silt loam

B horizon:
Color—hue of 10YR, value of 4 to 6, chroma of 1 to 4
Texture—silty clay loam, silt loam

Cg horizon:
Color—hue of 10YR, value of 4 to 6, chroma of 1 or 2
Texture—silt loam, silty clay loam

Richland Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Colluvium derived from sandstone, siltstone, and shale
Landscape position: Colluvial foot slopes, fans, and toe slopes at the base of hillsides
Slope: 2 to 15 percent
Adjacent soils: Coshocton, Dekalb, Fitchville, Orrville, Westmoreland

Taxonomic class: Fine-loamy, mixed, mesic Typic Hapludalfs

Typical Pedon

Richland silt loam, 2 to 6 percent slopes; about 0.5 mile northeast of Piedmont, in Moorefield Township; 2,800 feet east and 2,165 feet south of the northwest corner of sec. 29, T. 10 N., R. 6 W.

Ap—0 to 12 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium and fine granular structure; friable; many very fine roots; about 10 percent flat or rounded rock fragments; medium acid; abrupt smooth boundary.

BA—12 to 20 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common very fine roots; many faint brown (10YR 5/3) silt coatings on faces of peds; about 10 percent flat or rounded rock fragments; slightly acid; clear wavy boundary.

Bt1—20 to 27 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common faint brown (10YR 5/3) clay films on faces of peds; about 10 percent flat or rounded rock fragments; slightly acid; clear wavy boundary.

Bt2—27 to 34 inches; yellowish brown (10YR 5/4) gravelly clay loam; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; about 20 percent flat or rounded rock fragments; slightly acid; clear wavy boundary.

Bt3—34 to 52 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; about 10 percent flat or rounded rock fragments; medium acid; clear wavy boundary.

BC—52 to 56 inches; yellowish brown (10YR 5/4), stratified gravelly loam and gravelly clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; about 20 percent flat or rounded rock fragments; medium acid; clear wavy boundary.

C1—56 to 70 inches; yellowish brown (10YR 5/4) gravelly loam; massive; friable; about 30 percent flat or rounded rock fragments; medium acid; gradual wavy boundary.

C2—70 to 80 inches; yellowish brown (10YR 5/4) gravelly loam; thin strata of very gravelly sandy loam in the upper part; massive; friable; about 20 percent gravel; medium acid.

Range in Characteristics

Thickness of the solum: 44 to 60 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—5 to 15 percent; Bt horizon—5 to 20 percent in the upper

part, 10 to 35 percent in the lower part; C horizon—20 to 50 percent

Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 to 4
Texture—silt loam

Bt horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 3 to 6
Texture—loam, silt loam, clay loam, silty clay loam, or sandy clay loam in the fine-earth fraction

C horizon:
Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 4 to 6
Texture—loam, clay loam, or silty clay loam in the fine-earth fraction

Rigley Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Parent material: Colluvium and residuum derived from weakly cemented sandstone
Landscape position: Side slopes
Slope: 15 to 40 percent
Adjacent soils: Coshocton, Gilpin, Germano, Hazleton, Westmoreland

Taxonomic class: Coarse-loamy, mixed, mesic Typic Hapludults

Typical Pedon

Rigley loam, 25 to 40 percent slopes; about 1.5 miles northwest of Germano, in Rumley Township; about 2,930 feet west and 660 feet south of the northeast corner of sec. 33, T. 11 N., R. 4 W.

Oe—1 inch to 0; partially decomposed leaf litter.
A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; weak fine granular structure; friable; many fine roots; about 5 percent rock fragments; very strongly acid; abrupt smooth boundary.
BE—4 to 8 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; common fine roots; common faint silt coatings on faces of peds; about 5 percent rock fragments; very strongly acid; clear wavy boundary.
Bt1—8 to 18 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; about 10 percent rock fragments; very strongly acid; clear wavy boundary.
Bt2—18 to 26 inches; yellowish brown (10YR 5/4) channery sandy loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; about 15 percent rock fragments; common soft fragments; very strongly acid; clear wavy boundary.
Bt3—26 to 35 inches; yellowish brown (10YR 5/4) channery sandy loam; weak medium subangular blocky structure; friable; few fine roots; few distinct brown (7.5YR 5/4) clay films on faces of peds; about 20 percent rock fragments; common soft fragments; very strongly acid; clear wavy boundary.
Bt4—35 to 44 inches; light yellowish brown (10YR 6/4) channery sandy loam; weak medium subangular blocky structure; friable; few fine roots; few distinct brown (7.5YR 5/4) clay films on faces of peds; about 25 percent rock fragments; common soft fragments; very strongly acid; clear wavy boundary.
C1—44 to 52 inches; dark yellowish brown (10YR 4/4) very channery sandy loam; massive; friable; few fine roots; common soft fragments; about 40 percent rock fragments; very strongly acid; clear wavy boundary.
C2—52 to 62 inches; light yellowish brown (10YR 6/4) very channery sandy loam; massive; friable; few fine roots; common soft fragments; about 50 percent rock fragments; very strongly acid; clear wavy boundary.
C3—62 to 75 inches; light yellowish brown (10YR 6/4) extremely channery sandy loam; massive; friable; about 65 percent rock fragments; very strongly acid; clear wavy boundary.
Cr—75 to 80 inches; yellowish brown (10YR 5/4), soft sandstone bedrock.

Range in Characteristics

Thickness of the solum: 40 to 54 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: A or Ap horizon—5 to 10 percent; Bt horizon—5 to 35 percent; C horizon—20 to 70 percent

A horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 or 3
Texture—loam

Ap horizon (if it occurs):
Color—hue of 10YR, value of 4, chroma of 2 or 3
Texture—loam

Bt horizon:
Color—hue of 7.5YR or 10YR, value and chroma of 4 to 6
Texture—loam or sandy loam in the fine-earth fraction

C horizon:
Color—hue of 7.5YR or 10YR, value and chroma of 4 to 6
Texture—sandy loam in the fine-earth fraction

Tioga Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Parent material: Recent alluvium
Landscape position: Flood plains
Slope: 0 to 2 percent
Adjacent soils: Coshocton, Fitchville, Glenford, Orrville

Taxonomic class: Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts

Typical Pedon

Tioga silt loam, occasionally flooded; about 2.5 miles west of Jewett, in Rumley Township; 1,215 feet west and 1,715 feet south of the northeast corner of sec. 24, T. 11 N., R. 5 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium and fine granular structure; friable; many very fine roots; medium acid; abrupt smooth boundary.
AB—10 to 18 inches; brown (10YR 4/3) loam; moderate coarse and medium granular structure; friable; common very fine roots; slightly acid; clear wavy boundary.
Bw1—18 to 26 inches; brown (10YR 4/3) fine sandy loam; weak medium subangular blocky structure; friable; few very fine roots; very dark grayish brown (10YR 3/2) coatings on faces of peds; slightly acid; clear wavy boundary.
Bw2—26 to 31 inches; brown (10YR 4/3) fine sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; slightly acid; clear wavy boundary.
Bw3—31 to 36 inches; brown (10YR 4/3) sandy loam; weak fine subangular blocky structure; very friable; few very fine roots; slightly acid; clear wavy boundary.
C1—36 to 60 inches; dark yellowish brown (10YR 4/4), stratified sandy loam, fine sandy loam, and loam; massive; very friable; few very fine roots; neutral; clear wavy boundary.
C2—60 to 70 inches; dark yellowish brown (10YR 4/4) sandy loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; massive; very friable; neutral; clear wavy boundary.
C3—70 to 80 inches; grayish brown (2.5Y 5/2), stratified sandy loam, loam, and silt loam; many medium faint dark gray (N 4/0) mottles; massive; very friable; neutral.

Range in Characteristics

Thickness of the solum: 20 to 40 inches
Depth to bedrock: More than 60 inches
Content of rock fragments: Ap horizon—0 to 10 percent; Bw horizon—0 to 25 percent; C horizon—0 to 40 percent

Ap horizon:
Color—hue of 10YR, value of 3 or 4, chroma of 2 to 4
Texture—silt loam

Bw horizon:
Color—hue of 10YR, value and chroma of 3 or 4
Texture—silt loam, loam, fine sandy loam, or sandy loam having thin lenses of loamy fine sand or loamy sand in the fine-earth fraction

C horizon:
Color—hue of 7.5YR to 2.5Y, value of 4 or 5, chroma of 2 to 4
Texture—loamy sand, sandy loam, fine sandy loam, loam, or silt loam in the fine-earth fraction

Upshur Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Slow
Parent material: Residuum derived from shale and mudstone
Landscape position: Ridgetops and side slopes in the uplands
Slope: 6 to 25 percent
Adjacent soils: Berks, Gilpin, Guernsey, Lowell, Westmoreland

Taxonomic class: Fine, mixed, mesic Typic Hapludalfs

Typical Pedon

Upshur silty clay loam, 6 to 15 percent slopes, eroded; about 2.5 miles southeast of Moorefield, in Moorefield

Township; about 605 feet west and 1,955 feet north of the southeast corner of sec. 10, T. 10 N., R. 6 W.

Ap—0 to 7 inches; reddish brown (5YR 4/3) silty clay loam, light reddish brown (5YR 6/3) dry; moderate medium granular structure; firm; many fine roots; about 5 percent shale fragments; slightly acid; abrupt smooth boundary.
Bt1—7 to 13 inches; reddish brown (2.5YR 4/4) clay; weak medium subangular blocky structure; firm, plastic and sticky; common fine roots; few distinct clay films on faces of peds; reddish brown (5YR 4/3) organic coatings on linings of root channels; about 5 percent shale fragments; very strongly acid; clear wavy boundary.
Bt2—13 to 28 inches; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; firm, plastic and sticky; few fine roots; common distinct clay films on faces of peds; about 5 percent shale fragments; very strongly acid; clear wavy boundary.
Bt3—28 to 42 inches; reddish brown (2.5YR 4/4) silty clay; moderate medium subangular blocky structure; firm, plastic and sticky; few fine roots; common distinct clay films on faces of peds; about 5 percent shale fragments; few slickensides; strongly acid; clear wavy boundary.
BC—42 to 48 inches; dark reddish brown (2.5YR 3/4) silty clay loam; weak medium subangular blocky structure; firm, plastic and sticky; few fine roots; few faint clay films on faces of peds; about 5 percent shale fragments; neutral; clear wavy boundary.
C1—48 to 56 inches; dark reddish brown (2.5YR 3/4) silty clay loam; massive; firm; about 5 percent shale fragments; neutral; clear wavy boundary.
C2—56 to 64 inches; dark reddish brown (2.5YR 3/4) silty clay loam; massive; firm; about 10 percent shale fragments; neutral; clear wavy boundary.
Cr—64 to 66 inches; soft shale bedrock; slight effervescence.

Range in Characteristics

Thickness of the solum: 26 to 50 inches
Depth to bedrock: More than 40 inches
Content of rock fragments: Ap horizon—0 to 5 percent; Bt horizon—0 to 15 percent; C horizon—5 to 35 percent

Ap horizon:
Color—hue of 2.5YR to 7.5YR, value of 3 or 4, chroma of 2 to 4
Texture—silty clay loam, silty clay

Bt horizon:
Color—hue of 10R to 5YR, value of 3 or 4, chroma of 3 to 6
Texture—silty clay, clay

C horizon:
Color—hue of 10R to 5YR, value of 3 or 4, chroma of 3 to 6; variegated colors of olive or olive brown in some pedons
Texture—silty clay, silty clay loam, or silt loam in the fine-earth fraction

Westmoreland Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate
Parent material: Colluvium and residuum derived from shale, siltstone, and sandstone
Landscape position: Foot slopes, side slopes, and ridgetops in the uplands
Slope: 6 to 70 percent
Adjacent soils: Berks, Coshocton, Dekalb, Hazleton, Lowell

Taxonomic class: Fine-loamy, mixed, mesic Ultic Hapludalfs

Typical Pedon

Westmoreland loam in an area of Westmoreland-Dekalb complex, 40 to 70 percent slopes; about 1.5 miles northeast of Jewett, in Rumley Township; 985 feet west and 80 feet south of the center of sec. 1, T. 12 N., R. 5 W.

Oe—1 inch to 0; partially decomposed leaf litter.
A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine roots; about 5 percent sandstone fragments; very strongly acid; abrupt smooth boundary.
E—4 to 8 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; very friable; common fine roots; about 5 percent sandstone fragments; very strongly acid; clear wavy boundary.
Bt1—8 to 15 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; about 10 percent sandstone fragments; very strongly acid; clear wavy boundary.
Bt2—15 to 24 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky structure;

friable; few fine roots; common distinct clay films on faces of peds; about 10 percent sandstone fragments; very strongly acid; clear wavy boundary.

Bt3—24 to 32 inches; yellowish brown (10YR 5/4) channery clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct brown (7.5YR 5/4) clay films on faces of peds; about 15 percent sandstone fragments; very strongly acid; clear wavy boundary.

C—32 to 48 inches; yellowish brown (10YR 5/4) extremely channery loam; massive; firm; few fine roots; about 65 percent sandstone fragments; strongly acid; clear smooth boundary.

R—48 to 50 inches; dark yellowish brown (10YR 4/4), hard sandstone bedrock.

Range in Characteristics

Thickness of the solum: 30 to 40 inches

Depth to bedrock: More than 40 inches

Content of rock fragments: A or Ap horizon—2 to 15 percent; Bt horizon—2 to 30 percent; C horizon—45 to 90 percent

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, chroma of 2 or 3

Texture—loam, silt loam

Bt horizon:

Color—hue of 10YR or 7.5YR, value of 4 or 5, chroma of 4 to 6

Texture—silt loam, silty clay loam, clay loam, or loam in the fine-earth fraction

C horizon:

Color—hue of 7.5YR to 2.5Y, value of 4 or 5, chroma of 4 to 6

Texture—silt loam, silty clay loam, clay loam, or loam in the fine-earth fraction

Formation of the Soils

This section describes how the major factors of soil formation have affected the soils in Harrison County and explains some of the processes in soil formation.

Factors of Soil Formation

Soils form through processes that act on deposited or accumulated geologic material. The major factors in soil formation are parent material, climate, relief, living organisms, and time.

Climate and living organisms, particularly vegetation, are the active forces in soil formation. Their effect on the parent material is modified by relief and by the length of time that the parent material has been acted upon. The relative importance of each factor differs from place to place. In some areas one factor determines most of the soil properties. Normally, however, the interaction of all five factors determines what kind of soil forms in any given place.

Parent Material

The soils in Harrison County formed in several kinds of parent material. These are residuum, colluvium, loess, surface mine spoil, lacustrine sediments, and alluvium.

Bedrock residuum is the most extensive kind of parent material in the county. It includes the material weathered from shale, sandstone, siltstone, and limestone. The Berks soils formed in bedrock residuum. Some soils in small areas on ridgetops and benches in the county formed in as much as 36 inches of loess and the underlying residuum. The Keene soils formed in loess and the underlying siltstone and shale residuum.

Most of the soils on side slopes formed in residuum and colluvium. Colluvium is soil material or rock fragments, or both, that have been moved downhill by gravity. Soils that formed in residuum and colluvium derived from sandstone bedrock are coarse textured in the subsoil. The Hazleton soils are an example. Residuum and colluvium derived from clayey shale or limestone are fine textured or moderately fine textured. The soils that formed in these parent materials dominantly are fine textured or moderately fine textured in the subsoil. The Upshur soils formed in shale residuum. They are fine textured. Residuum and colluvium derived from siltstone, shale, and sandstone are medium textured or moderately fine textured. The soils that formed in this combination of parent material generally are medium textured or moderately fine textured in the subsoil. The Coshocton soils are an example.

Surface mine spoil is a mixture of partly weathered fine-earth material and fragments of shale, sandstone, siltstone, and limestone. It was piled up or graded during surface mining for coal or clay shale. The Bethesda, Fairpoint, and Morristown soils formed in spoil from strip mines. The spoil is dominantly fragments of rock and some sand, silt, and clay.

Areas of lacustrine material, or lake bottom sediments, are moderately extensive in this county. The layered characteristics of the parent material in these areas are reflected in the subsoil of the Fitchville and Glenford soils.

Alluvium, which is deposited by floodwater, is the youngest parent material in the county. It is still accumulating as fresh sediment deposited during periods of stream overflow. The sediment is derived from the surface layer of the higher lying soils. The Nolin and Orrville soils formed in alluvium.

Climate

The climate in Harrison County is uniform. As a result, it has not greatly contributed to differences among the soils. It has favored both physical changes and chemical weathering of the parent material and the activity of living organisms.

Rainfall has leached the solum of the carbonates in the parent material of some soils, such as the Glenford and Fitchville soils. The frequency of rainfall resulted in wetting and drying cycles that favored the translocation of clay minerals and the formation of soil structure in Guernsey, Westmoreland, and other soils in the county.

The range of temperature variations has favored both physical changes and chemical weathering of the parent material. Freezing and thawing aided the formation of soil structure. Warm temperatures in the summer favored chemical reactions in the weathering of primary minerals.

Both rainfall and temperature have favored plant growth and the accumulation of organic matter in all of the soils in the county. More information about the climate is available under the heading “General Nature of the County.”

Relief

Relief affects the natural drainage of soils. It influences the amount of runoff and the depth to the seasonal high water table. Water that runs off sloping soils collects in depressions or is removed through a drainage system. Therefore, from an equal amount of rainfall, the sloping soils receive less total water and the depressional soils more total water than the nearly level soils. Gently sloping soils generally show the most development because they are neither saturated nor droughty. Soil formation on steep slopes tends to be inhibited by erosion and the limited amount of water that penetrates the surface.

Living Organisms

Plants, animals, bacteria, fungi, and other living organisms affect soil formation. At the time that the county was settled, the vegetation was dominantly a hardwood forest of oak, hickory, maple, yellow poplar, and ash. The soils that formed in these forested areas are subject to acid leaching. As a result, the subsoil generally is lower in exchangeable bases than the substratum.

Small animals, insects, earthworms, and burrowing animals leave channels in the soil, making it more permeable. Animals also mix the soil material and contribute organic matter to the soil. Worm channels and wormcasts are common in the surface layer of well drained soils, such as the Gilpin and Lowell soils. Crawfish channels are evident in poorly drained soils, such as the Melvin soils.

Human activities also affect soil formation. Examples of these activities are cultivation, seeding, drainage systems, irrigation, cutting and filling, and surface mining. Another example is the application of lime and fertilizer, which affect soil chemistry.

Time

Time is needed for the other factors of soil formation to produce their effects. The age of a soil is indicated, to some extent, by the degree of profile development. If the parent material weathers slowly, the soil forms slowly. In many areas, however, factors other than time have been responsible for most of the differences in the kind and distinctness of horizons in the different soils.

Most of the soils in the county are old and have a strongly expressed profile. The youngest soils are those that formed in spoil from strip mines. Examples are the Bethesda, Fairpoint, and Morristown soils. Periodic depositions of fresh sediment interrupt soil formation on flood plains. As a result, the Melvin and Orrville soils do not have a strongly expressed profile.

Processes of Soil Formation

Most of the soils in Harrison County have strongly expressed profiles. The processes of soil formation have resulted in distinct changes in the soils. The strongest development is evident in the soils on ridgetops and side slopes in the uplands and the soils on terraces along the major streams. In contrast, the soils on flood plains and in surface mined areas have been only slightly modified by the processes of soil formation.

The soil-forming processes are additions, removals, transfers, and transformations (Simonson 1959). Some of these processes result in differences among the surface layer, subsoil, and substratum.

The most important addition to the soils in this county is that of organic matter to the surface layer. A thin layer of organic matter accumulates under forest vegetation. If the soils are cleared and cultivated, this organic matter is mixed with underlying mineral material.

Leaching of carbonates from calcareous parent material is one of the most significant losses preceding many other chemical changes in the soils. The limestone and calcareous shale underlying undisturbed soils and combinations of these materials underlying surface mined soils have a high content of carbonates when first exposed to leaching. The soils that formed in residuum of limestone and calcareous shale bedrock, such as Lowell soils, still have carbonates at a depth of 30 to 50 inches. Most of the soils on uplands and terraces do not have carbonates within 5 feet of the surface and are very strongly acid to medium acid in the subsoil. Other minerals in the soils are subject to the chemical weathering that results from leaching, but their resistance is higher and their removal is slower.

Seasonal cycles of wetting and drying in the soil are largely responsible for the transfer of clay from the surface layer to the faces of peds in the subsoil. The fine clay particles are suspended in water percolating through the surface layer and then are deposited in the subsoil. This transfer accounts for the clay films on faces of peds in the subsoil of most soils on uplands and terraces. Guernsey and Glenford soils are examples of soils that have clay films in the subsoil.

The transformation of mineral compounds occurs in most soils. The results of this process are most

apparent if the formation of layers is not affected by rapid erosion or by the accumulation of material at the surface. When the silicate minerals are weathered chemically, other minerals, mainly layer lattice silicate clays, are produced. Most of the layer lattice clays remain in the subsoil.

References

Allan, P.F., L.E. Garland, and R. Dugan. 1963. Rating northeastern soils for their suitability for wildlife habitat. *In* Transactions of the twenty-eighth North American wildlife and natural resources conference, pp. 247-261.

American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

Carmean, Willard H. 1967. Soil survey refinements for predicting black oak site quality in southeastern Ohio. Soil Sci. Soc. Am. Proc. 31: 805-810.

Carter, Homer L., Wayne Matthews, and Harry DeLong. 1987. Ohio agricultural statistics and Ohio Department of Agriculture annual report. U.S. Dep. Agric., Natl. Agric. Stat. Serv.

Condit, D. Dale. 1912. Conemaugh Formation in Ohio. Ohio Geol. Surv. Bull. 17.

Lamborn, Raymond E. 1951. Limestones of eastern Ohio. Ohio Geol. Surv. Bull. 49.

Ramey, James E., and Wayne F. Matthews. 1988. 1988 Ohio agricultural statistics. Ohio Coop. Ext. Serv.

Simonson, Roy W. 1959. Outline of a generalized theory of soil genesis. Soil Sci. Soc. Am. Proc. 23: 152-156.

Stout, Wilber, Karl Van Steeg, and G.F. Lamb. 1943. Geology of water in Ohio. Geol. Surv. Ohio Bull. 44. (Reprinted 1968.)

United States Department of Agriculture, Natural Resources Conservation Service. 1996. National soil survey handbook. Soil Surv. Staff, title 430-VI. (Available in the State Office of the Natural Resources Conservation Service at Columbus, Ohio)

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210.

United States Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. U.S. Dep. Agric. Handb. 436.

United States Department of Agriculture, Soil Conservation Service. 1985. Harrison Soil and Water Conservation District resources inventory.

United States Department of Agriculture, Soil Conservation Service. 1992. Keys to soil taxonomy. 5th ed. Soil Surv. Staff, Soil Manage. Support Serv. Tech. Monogr. 19.

United States Department of Agriculture, Soil Conservation Service. 1993. Soil survey manual. Soil Surv. Staff, U.S. Dep. Agric. Handb. 18.

United States Department of Commerce, Bureau of the Census. 1991. 1990 census of population, number of inhabitants, Ohio, preliminary report.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese

and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than

geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by

streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or

saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low ..... less than 0.5 percent
Low ..... 0.5 to 1.0 percent
Moderately low ..... 1.0 to 2.0 percent
Moderate ..... 2.0 to 4.0 percent
High ..... 4.0 to 8.0 percent
Very high ..... more than 8.0 percent

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Perimeter drain. An artificial drain placed around the perimeter of a septic tank absorption field to lower the water table; also called a curtain drain.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow ..... 0.0 to 0.01 inch
Very slow ..... 0.01 to 0.06 inch
Slow ..... 0.06 to 0.2 inch
Moderately slow ..... 0.2 to 0.6 inch
Moderate ..... 0.6 inch to 2.0 inches
Moderately rapid ..... 2.0 to 6.0 inches
Rapid ..... 6.0 to 20 inches
Very rapid ..... more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil

is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Strongly sloping	6 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 40 percent
Very steep	40 to 70 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil

normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1951-87 at Cadiz, Ohio)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	35.4	18.9	27.2	64	-13	0	2.57	1.40	3.63	7	13.0
February	39.6	21.3	30.5	66	-13	0	2.25	1.02	3.08	6	6.5
March	50.3	29.6	40.0	79	6	33	3.06	1.79	4.10	8	4.2
April	62.9	39.8	51.4	84	18	122	3.57	2.02	4.87	9	1.6
May	72.7	49.7	61.2	88	29	358	3.99	2.34	5.35	9	.0
June	79.8	58.0	68.9	92	41	567	3.85	2.27	5.25	8	.0
July	83.2	62.1	72.7	93	47	704	4.25	2.38	5.83	8	.0
August	82.2	60.8	71.5	93	45	667	3.64	1.84	5.17	7	.0
September	76.6	54.5	65.6	92	35	468	2.73	1.02	4.05	6	.0
October	65.4	43.3	54.4	84	23	191	2.52	1.16	3.70	6	.0
November	51.9	33.8	42.9	75	11	20	2.96	1.62	4.21	7	1.4
December	40.2	24.4	32.3	68	-11	10	2.59	1.34	3.58	7	6.9
Yearly:											
Average	61.7	41.4	51.6	---	---	---	---	---	---	---	---
Extreme	---	---	---	95	-11	---	---	---	---	---	---
Total	---	---	---	---	---	3,140	37.98	32.97	42.78	88	33.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1951-87 at Cadiz, Ohio)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 21	Apr. 30	May 13
2 years in 10 later than--	Apr. 16	Apr. 26	May 8
5 years in 10 later than--	Apr. 8	Apr. 17	Apr. 28
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 15	Oct. 4
2 years in 10 earlier than--	Oct. 29	Oct. 20	Oct. 8
5 years in 10 earlier than--	Nov. 9	Oct. 30	Oct. 16

Table 3.--Growing Season

(Recorded in the period 1951-87 at Cadiz, Ohio)

Probability	Daily minimum temperature during growing season		
	Higher than 24 degrees F	Higher than 28 degrees F	Higher than 32 degrees F
	Days	Days	Days
9 years in 10	193	180	152
8 years in 10	200	185	158
5 years in 10	214	196	170
2 years in 10	228	206	182
1 year in 10	236	211	188

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AaB	Aaron silt loam, 2 to 6 percent slopes	861	0.3
AbC2	Aaron silty clay loam, 6 to 15 percent slopes, eroded	6,775	2.6
BkC	Berks channery silt loam, 6 to 15 percent slopes	359	0.1
BkD	Berks channery silt loam, 15 to 25 percent slopes	608	0.2
BkE	Berks channery silt loam, 25 to 40 percent slopes	4,828	1.8
BkF	Berks channery silt loam, 40 to 70 percent slopes	4,433	1.7
BmC	Berks-Aaron complex, 6 to 15 percent slopes	495	0.2
BnD	Berks-Guernsey complex, 15 to 25 percent slopes	1,123	0.4
BnE	Berks-Guernsey complex, 25 to 40 percent slopes	4,824	1.8
BpB	Bethesda channery silty clay loam, 0 to 8 percent slopes	546	0.2
BpD	Bethesda channery silty clay loam, 8 to 25 percent slopes	746	0.3
BpF	Bethesda channery silty clay loam, 25 to 70 percent slopes	2,363	0.9
BsD	Brookside silty clay loam, 15 to 25 percent slopes	68	*
Ca	Canadice silty clay loam	515	0.2
CcA	Caneadea silty clay loam, 0 to 2 percent slopes	2,223	0.8
CnB	Coshocton silt loam, 2 to 6 percent slopes	606	0.2
CnC	Coshocton silt loam, 6 to 15 percent slopes	4,708	1.8
CnD	Coshocton silt loam, 15 to 25 percent slopes	13,772	5.2
DkC	Dekalb channery loam, 6 to 15 percent slopes	363	0.1
Dm	Dumps, mine	307	0.1
FaB	Fairpoint silty clay loam, 0 to 8 percent slopes	192	*
FaD	Fairpoint silty clay loam, 8 to 25 percent slopes	367	0.1
FaE	Fairpoint silty clay loam, 25 to 40 percent slopes	568	0.2
FcA	Fitchville silt loam, 0 to 2 percent slopes	1,726	0.7
FcB	Fitchville silt loam, 2 to 6 percent slopes	1,442	0.5
GeC	Germano fine sandy loam, 6 to 15 percent slopes	616	0.2
GeD	Germano fine sandy loam, 15 to 25 percent slopes	1,983	0.8
GnB	Gilpin silt loam, 2 to 6 percent slopes	1,071	0.4
GnC	Gilpin silt loam, 6 to 15 percent slopes	8,852	3.4
GnD	Gilpin silt loam, 15 to 25 percent slopes	8,505	3.2
GoC	Gilpin-Coshocton complex, 6 to 15 percent slopes	1,186	0.5
GoD	Gilpin-Coshocton complex, 15 to 25 percent slopes	477	0.2
GpC	Gilpin-Lowell complex, 6 to 15 percent slopes	405	0.2
GpD	Gilpin-Lowell complex, 15 to 25 percent slopes	2,418	0.9
GsB	Glenford silt loam, 2 to 6 percent slopes	918	0.3
GsC	Glenford silt loam, 6 to 15 percent slopes	1,215	0.5
GtC	Guernsey silt loam, 6 to 15 percent slopes	2,650	1.0
GuD2	Guernsey silty clay loam, 15 to 25 percent slopes, eroded	24,463	9.3
GuE2	Guernsey silty clay loam, 25 to 40 percent slopes, eroded	4,343	1.7
HeD	Hazleton channery sandy loam, 15 to 25 percent slopes	961	0.4
HeE	Hazleton channery sandy loam, 25 to 40 percent slopes	163	*
HeF	Hazleton channery sandy loam, 40 to 70 percent slopes	1,597	0.6
KeB	Keene silt loam, 2 to 6 percent slopes	739	0.3
LnC	Lowell silt loam, 6 to 15 percent slopes	961	0.4
LoD2	Lowell silty clay loam, 15 to 25 percent slopes, eroded	2,130	0.8
LoE2	Lowell silty clay loam, 25 to 40 percent slopes, eroded	1,702	0.6
Me	Melvin silt loam, ponded	1,574	0.6
MnB	Morristown silty clay loam, 0 to 8 percent slopes	2,018	0.8
MnD	Morristown silty clay loam, 8 to 25 percent slopes	4,732	1.8
MoB	Morristown channery silty clay loam, 0 to 8 percent slopes, stony	4,446	1.7
MoD	Morristown channery silty clay loam, 8 to 25 percent slopes, stony	14,535	5.5
MoE	Morristown channery silty clay loam, 25 to 40 percent slopes, stony	828	0.3
MrF	Morristown channery silt loam, 25 to 70 percent slopes, bouldery	28,321	10.8
No	Nolin silt loam, occasionally flooded	1,843	0.7
Np	Nolin silt loam, frequently flooded	120	*
OmB	Omulga silt loam, 2 to 6 percent slopes	70	*
OmC	Omulga silt loam, 6 to 15 percent slopes	175	*
Or	Orrville silt loam, occasionally flooded	8,808	3.4
OsB	Oshtemo loam, 2 to 6 percent slopes	113	*
Pe	Peoga silt loam, rarely flooded	22	*
RcB	Richland silt loam, 2 to 6 percent slopes	622	0.2
RcC	Richland silt loam, 6 to 15 percent slopes	207	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
RgD	Rigley loam, 15 to 25 percent slopes	84	*
RgE	Rigley loam, 25 to 40 percent slopes	342	0.1
Tg	Tioga silt loam, occasionally flooded	301	0.1
Uc	Udorthents-Pits complex	1,383	0.5
UpC2	Upshur silty clay loam, 6 to 15 percent slopes, eroded	431	0.2
UpD2	Upshur silty clay loam, 15 to 25 percent slopes, eroded	250	*
WhC	Westmoreland silt loam, 6 to 15 percent slopes	207	*
WhD	Westmoreland silt loam, 15 to 25 percent slopes	221	*
WhE	Westmoreland silt loam, 25 to 40 percent slopes	1,396	0.5
WmE	Westmoreland-Coshocton complex, 25 to 40 percent slopes	4,993	1.9
WnE	Westmoreland-Dekalb complex, 25 to 40 percent slopes	20,815	7.9
WnF	Westmoreland-Dekalb complex, 40 to 70 percent slopes	29,554	11.2
WoF	Westmoreland-Dekalb complex, 25 to 70 percent slopes, extremely bouldery	4,235	1.6
	Water areas less than 40 acres in size	1,481	.6
	Water areas more than 40 acres in size	6,500	2.5
	Total	262,800	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Map symbol and soil name	Land capability	Corn	Winter wheat	Oats	Orchardgrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass	Orchardgrass
		Bu	Bu	Bu	Tons	Tons	AUM*	AUM*
AaB---------- Aaron	IIe	100	40	65	4.0	2.7	4.8	7.2
AbC2---------- Aaron	IIIe	90	35	60	4.5	3.0	4.5	6.7
BkC---------- Berks	IIIe	80	34	55	2.8	1.9	4.0	6.0
BkD---------- Berks	IVe	70	30	46	2.4	1.6	3.7	5.5
BkE---------- Berks	VIe	---	---	---	---	---	2.0	3.0
BkF---------- Berks	VIIe	---	---	---	---	---	---	---
BmC---------- Berks-Aaron	IIIe	82	35	56	3.0	2.0	4.1	6.2
BnD---------- Berks-Guernsey	IVe	76	30	48	2.8	1.9	3.9	5.8
BnE---------- Berks-Guernsey	VIe	---	---	---	---	---	2.3	3.5
BpB, BpD--------- Bethesda	VIs	---	---	---	---	---	3.4	5.0
BpF---------- Bethesda	VIIe	---	---	---	---	---	---	---
BsD---------- Brookside	IVe	95	35	50	4.4	2.9	4.0	6.0
Ca---------- Canadice	IVw	75	---	60	2.5	1.7	3.4	5.0
CcA---------- Caneadea	IIIw	92	36	70	3.2	2.1	3.7	5.5

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Winter wheat	Oats	Orchardgrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass	Orchardgrass
		Bu	Bu	Bu	Tons	Tons	AUM*	AUM*
CnB--Coshocton	IIe	110	40	63	4.5	3.0	5.0	7.5
CnC--Coshocton	IIIe	95	34	53	4.0	2.7	5.0	7.5
CnD--Coshocton	IVe	90	30	50	3.5	2.3	5.0	7.5
DkC--Dekalb	IIIe	75	35	55	2.5	1.7	3.8	5.6
Dm**. Dumps								
FaB--Fairpoint	IIIs	---	25	45	2.5	1.5	3.0	5.5
FaD--Fairpoint	IVs	---	20	40	2.0	1.0	2.7	4.5
FaE--Fairpoint	VIe	---	---	---	---	---	2.0	3.0
FcA--Fitchville	IIw	110	38	70	4.3	2.9	4.6	6.8
FcB--Fitchville	IIe	100	34	62	4.3	2.9	4.6	6.8
GeC--Germano	IIIe	75	35	55	2.5	1.7	3.8	5.6
GeD--Germano	IVe	70	30	50	2.0	1.3	3.8	5.6
GnB--Gilpin	IIe	95	40	65	3.0	2.0	4.7	7.0
GnC--Gilpin	IIIe	85	35	60	3.0	2.0	4.7	7.0
GnD--Gilpin	IVe	80	30	55	2.5	1.7	4.0	6.0

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Winter wheat	Oats	Orchardgrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass	Orchardgrass
		Bu	Bu	Bu	Tons	Tons	AUM*	AUM*
GoC---Gilpin-Coshocton	IIIe	87	35	55	3.1	2.1	4.7	7.0
GoD---Gilpin-Coshocton	IVe	82	25	50	2.7	1.8	4.0	6.0
GpC---Gilpin-Lowell	IIIe	91	36	58	3.7	2.5	5.0	7.2
GpD---Gilpin-Lowell	IVe	82	30	57	3.0	2.0	4.4	6.5
GsB---Glenford	IIe	115	45	70	5.0	3.4	5.0	7.5
GsC---Glenford	IIIe	105	42	66	4.7	3.1	4.7	7.0
GtC---Guernsey	IIIe	90	35	60	4.5	3.0	4.5	6.7
GuD2---Guernsey	IVe	85	30	55	4.0	2.7	4.0	6.0
GuE2---Guernsey	VIe	---	---	---	---	---	3.5	5.5
HeD---Hazleton	IVe	75	30	52	3.5	2.3	3.5	5.5
HeE---Hazleton	VIe	---	---	---	---	---	2.7	3.2
HeF---Hazleton	VIIe	---	---	---	---	---	---	---
KeB---Keene	IIe	110	40	65	5.0	3.4	4.8	7.2
LnC---Lowell	IIIe	100	38	55	4.2	2.8	5.4	8.0
LoD2---Lowell	IVe	80	30	50	4.0	2.7	4.0	6.0

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Winter wheat	Oats	Orchardgrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass	Orchardgrass
		Bu	Bu	Bu	Tons	Tons	AUM*	AUM*
LoE2--Lowell	VIe	---	---	---	---	---	3.4	5.0
Me--Melvin	Vw	---	---	---	---	---	---	---
MnB--Morristown	IIIs	---	30	50	3.0	2.0	4.0	6.0
MnD--Morristown	IVs	---	25	45	2.5	1.7	3.4	5.0
MoB, MoD--Morristown	VIs	---	---	---	---	---	2.0	3.0
MoE, MrF--Morristown	VIIe	---	---	---	---	---	---	---
No--Nolin	IIw	120	48	70	5.1	3.4	6.0	9.0
Np--Nolin	IIw	105	42	60	4.0	2.8	6.0	8.5
OmB--Omulga	IIe	115	45	65	4.8	3.2	5.4	8.0
OmC--Omulga	IIIe	105	42	60	4.5	3.0	5.0	7.5
Or--Orrville	IIw	110	45	75	4.5	3.0	3.4	5.0
OsB--Oshtemo	IIIs	115	40	65	5.0	3.4	4.8	7.2
Pe--Peoga	IIIw	95	40	65	3.0	2.0	3.7	5.5
RcB--Richland	IIe	125	45	75	4.0	2.7	5.6	8.3
RcC--Richland	IIIe	120	40	70	3.5	2.3	5.2	7.7

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Corn	Winter wheat	Oats	Orchardgrass-alfalfa hay	Timothy-red clover hay	Kentucky bluegrass	Orchardgrass
		Bu	Bu	Bu	Tons	Tons	AUM*	AUM*
RgD--Rigley	IVe	90	36	56	4.1	2.7	4.0	6.0
RgE--Rigley	VIIe	---	---	---	---	---	3.4	5.0
Tg--Tioga	IIw	105	45	75	3.5	2.3	4.0	6.0
Uc**. Udorthents-Pits								
UpC2--Upshur	IVe	95	35	60	5.0	3.4	5.0	7.5
UpD2--Upshur	VIe	---	---	---	---	---	4.0	6.0
WhC--Westmoreland	IIIe	105	40	61	4.5	3.0	5.0	7.5
WhD--Westmoreland	IVe	95	38	60	4.5	3.0	5.0	7.5
WhE--Westmoreland	VIe	---	---	---	---	---	3.4	5.0
WmE--Westmoreland-Coshocton	VIe	---	---	---	---	---	3.7	5.5
WnE--Westmoreland-Dekalb	VIe	---	---	---	---	---	3.7	5.5
WnF--Westmoreland-Dekalb	VIIe	---	---	---	---	---	---	---
WoF--Westmoreland-Dekalb	VIIs	---	---	---	---	---	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 6.--Capability Classes and Subclasses

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problems (s)
		Acres	Acres	Acres
I	301	---	---	---
II	18,826	6,329	12,497	---
III	33,742	29,174	2,245	2,323
IV	59,761	54,147	515	5,099
V	1,574	---	1,574	---
VI	66,933	45,277	---	21,656
VII	73,375	69,140	---	4,235
VIII	---	---	---	---

Table 7.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AaB	Aaron silt loam, 2 to 6 percent slopes
CnB	Coshocton silt loam, 2 to 6 percent slopes
FcA	Fitchville silt loam, 0 to 2 percent slopes (where drained)
FcB	Fitchville silt loam, 2 to 6 percent slopes (where drained)
GnB	Gilpin silt loam, 2 to 6 percent slopes
GsB	Glenford silt loam, 2 to 6 percent slopes (where drained)
KeB	Keene silt loam, 2 to 6 percent slopes
No	Nolin silt loam, occasionally flooded
Np	Nolin silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
OmB	Omulga silt loam, 2 to 6 percent slopes
Or	Orrville silt loam, occasionally flooded (where drained)
OsB	Oshtemo loam, 2 to 6 percent slopes
Pe	Peoga silt loam, rarely flooded (where drained)
RcB	Richland silt loam, 2 to 6 percent slopes
Tg	Tioga silt loam, occasionally flooded

Table 8.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
AaB, AbC2-------- Aaron	4C	Slight	Slight	Slight	Severe	Black oak---------- White ash---------- Black locust-------- Hickory------------- Sugar maple--------- Northern red oak---- Black walnut-------- American elm--------	85 76 78 --- --- --- --- ---	67 --- --- --- --- --- --- ---	Northern red oak, white ash, black locust, hickory, sugar maple, northern red oak, black walnut, American elm.
BkC-------------- Berks	4F	Slight	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	70 70 ---	52 52 ---	Virginia pine, eastern white pine, Norway spruce, red pine.
BkD, BkE--------- Berks (north aspect)	4R	Slight	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	70 70 ---	52 52 ---	Virginia pine, eastern white pine, Norway spruce, red pine.
BkD, BkE--------- Berks (south aspect)	3R	Slight	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	60 60 ---	43 43 ---	Virginia pine, eastern white pine, Norway spruce, red pine.
BkF-------------- Berks (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	70 70 ---	52 52 ---	Virginia pine, eastern white pine, Norway spruce, red pine.
BkF-------------- Berks (south aspect)	3R	Moderate	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	60 60 ---	43 43 ---	Virginia pine, eastern white pine, Norway spruce, red pine.
BmC**: Berks-----------	4F	Slight	Moderate	Slight	Slight	Northern red oak---- Black oak---------- Black cherry--------	70 70 ---	52 52 ---	Virginia pine, eastern white pine, Norway spruce, red pine.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
BmC**:									
Aaron	4C	Slight	Slight	Slight	Severe	Black oak	85	67	Northern red oak, white oak, white ash, yellow poplar, eastern white pine.
						White ash	76	---	
						Black locust	78	---	
						Hickory	---	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
						Black walnut	---	---	
						American elm	---	---	
BnD**, BnE**:									
Berks (north aspect)	4R	Slight	Moderate	Slight	Slight	Northern red oak	70	52	Virginia pine, eastern white pine, Norway spruce, red pine.
						Black oak	70	52	
						Black cherry	---	---	
Guernsey (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow poplar	95	98	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	
BnD**, BnE**:									
Berks (south aspect)	3R	Slight	Moderate	Slight	Slight	Northern red oak	60	43	Virginia pine, eastern white pine, Norway spruce, red pine.
						Black oak	60	43	
						Black cherry	---	---	
Guernsey (south aspect)	4R	Moderate	Moderate	Slight	Severe	Northern red oak	70	52	White oak, yellow poplar, white ash, northern red oak, eastern white pine, red pine.
						White oak	65	48	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
BpB	4F	Slight	Severe	Slight	Moderate	Northern red oak	70	52	Eastern white pine, red pine, black locust, yellow poplar, white ash, northern red oak.
Bethesda						Yellow poplar	90	---	
						White ash	---	---	
						Black locust	75	---	
						Black cherry	---	---	
						Red maple	---	---	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
BpD--Bethesda	4R	Moderate	Severe	Slight	Moderate	Northern red oak Yellow poplar White ash Black locust Black cherry Red maple	70 90 --- 75 --- ---	52 --- --- --- --- ---	Eastern white pine, red pine, black locust, yellow poplar, white ash, northern red oak.
BpF--Bethesda	4R	Severe	Severe	Slight	Moderate	Northern red oak Yellow poplar White ash Black locust Black cherry Red maple	70 90 --- 75 --- ---	52 --- --- --- --- ---	Eastern white pine, red pine, black locust, yellow poplar, white ash, northern red oak.
BsD--Brookside (north aspect)	5R	Moderate	Slight	Slight	Moderate	Northern red oak Yellow poplar White oak Black walnut Black cherry Sugar maple White ash	86 96 --- --- --- --- ---	68 100 --- --- --- --- ---	Eastern white pine, black walnut, yellow poplar, white ash, red pine, northern red oak, white oak.
BsD--Brookside (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak White oak Black walnut Black cherry Sugar maple White ash Yellow poplar	80 75 --- --- --- --- ---	62 57 --- --- --- --- ---	Eastern white pine, red pine, yellow poplar, black walnut, white ash, northern red oak, white oak.
Ca--Canadice	2W	Slight	Severe	Moderate	Severe	Red maple Pin oak Swamp white oak	50 --- ---	32 --- ---	Sweetgum, baldcypress, sycamore, cottonwood, red maple.
CcA--Caneadea	4C	Slight	Severe	Severe	Severe	Northern red oak Sugar maple White ash Black cherry Slippery elm Red maple White oak	70 65 --- --- --- --- ---	52 40 --- --- --- --- ---	Austrian pine, green ash, black oak, yellow poplar, pin oak, red maple, American sycamore, eastern cottonwood.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CnB, CnC--Coshocton	4A	Slight	Slight	Slight	Severe	Northern red oak White oak Yellow poplar White ash Sugar maple Black cherry	80 75 90 --- --- ---	62 57 90 --- --- ---	Eastern white pine, yellow poplar, northern red oak, white oak, red pine, white ash.
CnD--Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak White oak Yellow poplar White ash Sugar maple Black cherry	80 75 90 --- --- ---	62 57 90 --- --- ---	Eastern white pine, yellow poplar, northern red oak, white oak, red pine, white ash.
CnD--Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak Northern red oak Yellow poplar White ash Sugar maple Black cherry	65 --- --- --- --- ---	48 --- --- --- --- ---	Eastern white pine, yellow poplar, northern red oak, white oak, white ash, red pine.
DkC--Dekalb	4F	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Black oak	70 --- ---	52 --- ---	Eastern white pine, Virginia pine, red pine, Austrian pine, Japanese larch.
FaB, FaD, FaE--Fairpoint	---	---	---	---	---	---	---	---	Eastern white pine, black locust, yellow poplar, northern red oak.
FcA, FcB--Fitchville	5A	Slight	Slight	Slight	Severe	Pin oak Northern red oak Yellow poplar Sugar maple Red maple	90 80 --- --- ---	72 62 --- --- ---	Eastern white pine, white ash, green ash, yellow poplar, red pine, white oak, northern red oak, black cherry, black locust, American sycamore.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
GeC--- Germano	4D	Slight	Slight	Moderate	Moderate	Northern red oak----	80	62	Yellow poplar, white ash, white oak, black walnut, northern red oak, eastern white pine, red pine.
						Yellow poplar-------	90	90	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
GeD--- Germano (north aspect)	4R	Moderate	Slight	Moderate	Moderate	Northern red oak----	80	62	White ash, white oak, black walnut, northern red oak, eastern white pine, red pine.
						Yellow poplar-------	90	90	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
GeD--- Germano (south aspect)	3R	Moderate	Moderate	Moderate	Moderate	Northern red oak----	65	48	White ash, white oak, black walnut, northern red oak, eastern white pine, red pine.
						Yellow poplar-------	---	---	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
GnB, GnC--- Gilpin	4A	Slight	Slight	Slight	Moderate	Northern red oak----	80	62	White oak, Virginia pine, eastern white pine, black cherry.
						Yellow poplar-------	95	98	
						Black cherry--------	---	---	
GnD--- Gilpin (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak----	80	62	Virginia pine, eastern white pine, black cherry.
						Yellow poplar-------	95	98	
						Black cherry--------	---	---	
GnD--- Gilpin (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak----	70	52	Virginia pine, eastern white pine, black cherry.
						Yellow poplar-------	90	90	
						Black cherry--------	---	---	
GoC**:									
Gilpin---	4A	Slight	Slight	Slight	Moderate	Northern red oak----	80	62	Virginia pine, eastern white pine, black cherry.
						Yellow poplar-------	95	98	
						Black cherry--------	---	---	
Coshocton-------	4A	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, northern red oak, white oak, red pine, white ash.
						White oak-----------	75	57	
						Yellow poplar-------	90	90	
						White ash-----------	---	---	
						Sugar maple---------	---	---	
						Black cherry--------	---	---	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
GoD**:									
Gilpin (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak	80	62	Virginia pine, eastern white pine, black cherry.
						Yellow poplar	95	98	
						Black cherry	---	---	
Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	80	62	Eastern white pine, yellow poplar, northern red oak, white oak, red pine, white ash.
						White oak	75	57	
						Yellow poplar	90	90	
						White ash	---	---	
						Sugar maple	---	---	
						Black cherry	---	---	
GoD**:									
Gilpin (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	Virginia pine, eastern white pine, black cherry.
						Yellow poplar	90	90	
						Black cherry	---	---	
Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak	65	48	Eastern white pine, yellow poplar, northern red oak, white oak, red pine.
						Northern red oak	---	---	
						Yellow poplar	---	---	
						White ash	---	---	
						Sugar maple	---	---	
						Black cherry	---	---	
GpC**:									
Gilpin	4A	Slight	Slight	Slight	Moderate	Northern red oak	80	62	Virginia pine, eastern white pine, black cherry, yellow poplar.
						Yellow poplar	95	98	
Lowell	5A	Slight	Slight	Slight	Severe	Black oak	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
						White ash	78	---	
						Hickory	---	---	
						Black locust	77	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
GpD**:									
Gilpin (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak	80	62	Virginia pine, eastern white pine, black cherry, yellow poplar.
						Yellow poplar	95	98	
Lowell (north aspect)	5R	Moderate	Slight	Slight	Severe	Black oak	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
						White ash	78	---	
						Hickory	---	---	
						Black locust	77	---	
						Sugar maple	---	---	
						Northern red oak	---	---	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
GpD**:									
Gilpin (south aspect)	4R	Moderate	Moderate	Slight	Moderate	Northern red oak	70	52	Virginia pine, eastern white pine, black cherry, yellow poplar.
						Yellow poplar	90	90	
Lowell (south aspect)	5R	Moderate	Slight	Slight	Severe	Black oak	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
						White ash	78	---	
						Hickory	---	---	
						Black locust	77	---	
						Sugar maple	---	---	
						Northern red oak	---	---	
GsB, GsC--------- Glenford	5A	Slight	Slight	Slight	Severe	Northern red oak	86	68	Eastern white pine, red pine, yellow poplar, green ash, white ash, white oak, northern red oak, black cherry, black locust, American sycamore.
						Yellow poplar	96	100	
						White oak	---	---	
						White ash	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
GtC-------------- Guernsey	4A	Slight	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow poplar	95	98	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	
GuD2, GuE2------- Guernsey (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	78	60	Eastern white pine, yellow poplar, green ash, white ash, red pine, white oak, northern red oak.
						Yellow poplar	95	98	
						Sugar maple	---	---	
						White ash	---	---	
						White oak	---	---	
						Black cherry	---	---	
GuD2, GuE2------- Guernsey (south aspect)	4R	Moderate	Moderate	Slight	Severe	Northern red oak	70	52	White oak, yellow poplar, white ash, northern red oak, eastern white pine, red pine.
						White oak	65	48	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
HeD, HeE--------- Hazleton (north aspect)	4R	Slight	Slight	Slight	Moderate	Northern red oak	70	52	White oak, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow poplar	80	71	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
HeD, HeE--- Hazleton (south aspect)	3R	Slight	Moderate	Slight	Slight	Northern red oak----	60	43	White oak, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Black oak----	60	43	
HeF--- Hazleton (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak----	70	52	White oak, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Yellow poplar----	80	71	
HeF--- Hazleton (south aspect)	3R	Moderate	Severe	Slight	Slight	Northern red oak----	60	43	White oak, eastern white pine, Norway spruce, Austrian pine, black cherry.
						Black oak----	60	43	
KeB--- Keene	4A	Slight	Slight	Slight	Severe	Northern red oak----	80	62	Eastern white pine, yellow poplar, black walnut, white ash, red pine, white oak, northern red oak.
						White oak----	75	57	
						Yellow poplar----	95	98	
						White ash----	---	---	
						Black walnut----	---	---	
						Black cherry----	---	---	
						Sugar maple----	---	---	
LnC--- Lowell	5A	Slight	Slight	Slight	Severe	Black oak----	88	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
						White ash----	78	---	
						Hickory----	---	---	
						Black locust----	77	---	
						Sugar maple----	---	---	
						Northern red oak----	---	---	
LoD2, LoE2--- Lowell	5R	Moderate	Slight	Slight	Severe	Black oak----	98	70	White ash, eastern white pine, white oak, northern red oak, yellow poplar.
						White ash----	78	---	
						Hickory----	---	---	
						Black locust----	77	---	
						Sugar maple----	---	---	
						Northern red oak----	---	---	
Me--- Melvin	5W	Slight	Severe	Severe	Severe	Pin oak----	90	72	Baldcypress, sweetgum, pin oak.
						Red maple----	---	---	
						Eastern cottonwood--	---	---	
						Hickory----	---	---	
						Hackberry----	---	---	
						American sycamore---	---	---	
						Black willow----	---	---	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MnB, MnD--------- Morristown	----	--------	--------	--------	--------	---	---	---	Eastern white pine, black locust, yellow poplar, Scotch pine, Norway spruce, white spruce, Virginia pine, American sycamore, eastern cottonwood, white ash, black ash, northern red oak, green ash, sweetgum.
MoB-------------- Morristown	4X	Slight	Moderate	Slight	Moderate	Northern red oak---- Black oak---------- White oak---------- Black cherry-------- White ash---------- American sycamore--- Eastern cottonwood-- Black locust-------- Black alder--------- Silver maple-------- Yellow poplar------- Bigtooth aspen------ Sweetgum-----------	70 70 60 --- --- --- --- --- --- --- --- --- ---	52 --- --- --- --- --- --- --- --- --- --- --- ---	Eastern white pine, black locust, red pine, Scotch pine, Norway spruce, white spruce, Virginia pine, American sycamore, eastern cottonwood, white ash, black ash, black walnut, black alder, silver maple, bigtooth aspen.
MoD, MoE--------- Morristown	4R	Moderate	Moderate	Slight	Moderate	Northern red oak---- Black oak---------- White oak---------- Black cherry-------- White ash---------- American sycamore--- Eastern cottonwood-- Black locust-------- Black alder--------- Silver maple-------- Yellow poplar------- Bigtooth aspen------ Sweetgum-----------	70 70 60 --- --- --- --- --- --- --- --- --- ---	52 --- --- --- --- --- --- --- --- --- --- --- ---	Eastern white pine, black locust, red pine, Scotch pine, Norway spruce, white spruce, Virginia pine, American sycamore, eastern cottonwood, white ash, black ash, black walnut, black alder, silver maple, bigtooth aspen.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MrF--Morristown	4R	Severe	Moderate	Slight	Moderate	Northern red oak	70	52	Eastern white pine, black locust, red pine, Scotch pine, Norway spruce, white spruce, Virginia pine, American sycamore, eastern cottonwood, white ash, black ash, black walnut, black alder, silver maple, bigtooth aspen.
						Black oak	70	---	
						White oak	60	---	
						Black cherry	---	---	
						White ash	---	---	
						American sycamore	---	---	
						Eastern cottonwood	---	---	
						Black locust	---	---	
						Black alder	---	---	
						Silver maple	---	---	
						Yellow poplar	---	---	
						Bigtooth aspen	---	---	
						Sweetgum	---	---	
No--Nolin	5A	Slight	Slight	Slight	Severe	Northern red oak	90	72	Yellow poplar, eastern white pine, eastern cottonwood, white ash, cherrybark oak, sweetgum, black walnut.
						Yellow poplar	107	119	
						Sweetgum	92	112	
						Eastern cottonwood	---	---	
						Black walnut	---	---	
						American sycamore	---	---	
						Black oak	---	---	
						Red maple	---	---	
Np--Nolin	5A	Slight	Moderate	Slight	Severe	Northern red oak	90	72	Eastern cottonwood, green ash, cherrybark oak, sweetgum, pin oak.
						Sweetgum	92	112	
						Eastern cottonwood	---	---	
						Black willow	---	---	
						American sycamore	---	---	
						Black oak	---	---	
						Red maple	---	---	
OmB, OmC--Omulga	4D	Slight	Slight	Moderate	Severe	Northern red oak	80	62	Eastern white pine, black walnut, yellow poplar, white ash, red pine, white oak, northern red oak, green ash, black cherry, locust, American sycamore, eastern cottonwood.
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
Or Orrville	5A	Slight	Slight	Slight	Severe	Pin oak Northern red oak Yellow poplar Sugar maple White ash Black cherry	85 80 90 80 --- ---	67 62 90 50 --- ---	Eastern white pine, yellow poplar, green ash, red pine, white ash, white oak, northern red oak, black cherry, black locust, American sycamore.
OsB Oshtemo	4A	Slight	Slight	Slight	Moderate	White oak Red pine Eastern white pine Jack pine	70 78 85 68	52 150 196 100	Eastern white pine, red pine, jack pine.
Pe Peoga	5W	Slight	Severe	Moderate	Severe	Pin oak Sweetgum Swamp white oak Red maple	90 90 --- ---	72 106 --- ---	Eastern white pine, baldcypress, green ash, red maple, white ash, sweetgum, pin oak.
RcB, RcC Richland	5A	Slight	Slight	Slight	Moderate	Northern red oak Yellow poplar White ash Black walnut	85 95 --- ---	67 98 --- ---	Yellow poplar, black walnut, eastern white pine, red pine, white oak, northern red oak, white ash.
RgD, RgE Rigley (north aspect)	4R	Moderate	Slight	Slight	Moderate	White oak Black oak Northern red oak Yellow poplar American beech Hickory	75 78 --- 94 --- ---	57 60 --- 97 --- ---	White oak, northern red oak, yellow poplar, eastern white pine, shortleaf pine.
RgD, RgE Rigley (south aspect)	3R	Moderate	Moderate	Slight	Moderate	White oak Black oak Hickory Scarlet oak American beech Shortleaf pine	65 --- --- --- --- ---	48 --- --- --- --- ---	Eastern white pine, shortleaf pine, white oak.
Tg Tioga	4A	Slight	Slight	Slight	Severe	Northern red oak Yellow poplar Sugar maple Red maple	75 85 67 ---	57 81 41 ---	Eastern white pine, yellow poplar, Norway spruce, black walnut, northern red oak, white ash.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
UpC2---------- Upshur	3C	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow poplar------- Eastern white pine-- White oak-----------	65 80 80 ---	48 71 181 ---	Eastern white pine, Virginia pine, shortleaf pine, white ash, white oak.
UpD2---------- Upshur (north aspect)	4R	Moderate	Slight	Slight	Moderate	Northern red oak---- Yellow poplar------- Eastern white pine-- White oak-----------	70 90 90 ---	52 90 211 ---	Eastern white pine, Virginia pine, shortleaf pine, white oak, white ash.
UpD2---------- Upshur (south aspect)	3R	Moderate	Moderate	Slight	Moderate	Northern red oak---- Eastern white pine-- White oak-----------	65 75 ---	48 166 ---	Virginia pine, eastern white pine, shortleaf pine, eastern redcedar, white oak, white ash.
WhC---------- Westmoreland	4A	Slight	Slight	Slight	Severe	Northern red oak---- Yellow poplar------- Eastern white pine--	75 85 70	57 81 151	Eastern white pine, yellow poplar, Virginia pine, northern red oak, white ash.
WhD, WhE--------- Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow poplar------- Eastern white pine--	81 90 75	63 90 166	Black walnut, yellow poplar, eastern white pine, northern red oak, white ash.
WhD, WhE--------- Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow poplar------- Eastern white pine--	70 80 65	52 71 136	Eastern white pine, Virginia pine, northern red oak, white ash.
WmE**: Westmoreland (north aspect)-	4R	Moderate	Slight	Slight	Severe	Northern red oak---- Yellow poplar------- Eastern white pine--	81 90 75	63 90 166	Black walnut, yellow poplar, eastern white pine.

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WmE**: Coshocton (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	80	62	Eastern white pine, yellow poplar, northern red oak, white oak, red pine, white ash.
						White oak	75	57	
						Yellow poplar	90	90	
						White ash	---	---	
						Sugar maple	---	---	
						Black cherry	---	---	
WmE**: Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	70	52	Eastern white pine, Virginia pine.
						Yellow poplar	80	71	
						Eastern white pine	65	136	
Coshocton (south aspect)	3R	Moderate	Moderate	Slight	Severe	White oak	65	48	Eastern white pine, yellow poplar, northern red oak, white oak, white ash, red pine.
						Northern red oak	---	---	
						Yellow poplar	---	---	
						White ash	---	---	
						Sugar maple	---	---	
						Black cherry	---	---	
WnE**: Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	81	63	Black walnut, yellow poplar, eastern white pine.
						Yellow poplar	90	90	
						Eastern white pine	75	166	
Dekalb (north aspect)	4R	Slight	Moderate	Slight	Slight	Northern red oak	68	50	Eastern white pine, Virginia pine, white spruce, Norway spruce.
						Black cherry	---	---	
						Sugar maple	---	---	
						White oak	---	---	
WnE**: Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	70	52	Eastern white pine, Virginia pine.
						Yellow poplar	80	71	
						Eastern white pine	65	136	
Dekalb (south aspect)	3R	Slight	Severe	Slight	Slight	Northern red oak	58	41	Eastern white pine, Virginia pine, red pine, Austrian pine, Norway spruce.
						Black cherry	---	---	
						Sugar maple	---	---	
						White oak	---	---	
WnF**: Westmoreland (north aspect)	4R	Severe	Slight	Slight	Severe	Northern red oak	81	63	Black walnut, yellow poplar, eastern white pine.
						Yellow poplar	90	90	
						Eastern white pine	75	166	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WnF**: Dekalb (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak	68	50	Eastern white pine, Virginia pine, white pine, spruce, Norway spruce, white ash, northern red oak.
						Black cherry	---	---	
						Sugar maple	---	---	
						White oak	---	---	
WnF**: Westmoreland (south aspect)	4R	Severe	Slight	Slight	Severe	Northern red oak	70	52	Eastern white pine, Virginia pine.
						Yellow poplar	80	71	
						Eastern white pine	65	136	
Dekalb (south aspect)	3R	Moderate	Severe	Slight	Slight	Northern red oak	58	41	Eastern white pine, Virginia pine, red pine, Austrian pine, Norway spruce, white ash, northern red oak.
						Black cherry	---	---	
						Sugar maple	---	---	
						White oak	---	---	
WoF**: Westmoreland (north aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	81	63	Black walnut, yellow poplar, Virginia pine, white ash, northern red oak, white oak.
						Yellow poplar	90	90	
						Eastern white pine	75	166	
Dekalb (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak	68	50	Eastern white pine, Virginia pine, white pine, spruce, Norway spruce, white oak, white ash.
						Black cherry	---	---	
						White oak	---	---	
WoF**: Westmoreland (south aspect)	4R	Moderate	Slight	Slight	Severe	Northern red oak	70	52	Eastern white pine, Virginia pine, white pine, ash, northern red oak, white oak.
						Yellow poplar	80	71	
						Eastern white pine	65	36	

See footnotes at end of table.

Table 8.--Woodland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Seedling mortality	Wind-throw hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
WoF**: Dekalb (south aspect)	3R	Moderate	Severe	Slight	Slight	Northern red oak	58	41	Eastern white pine, Virginia pine, red pine, Austrian pine, white ash, white oak.
						Black cherry	---	---	
						White oak	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Woodland Harvesting and Regeneration Activities

(Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
AaB, AbC2 Aaron	Severe: low strength.	Severe: low strength.	Slight	Slight.
BkC Berks	Slight	Moderate: slope.	Slight	Slight.
BkD, BkE Berks	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
BkF Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BmC*:				
Berks	Slight	Moderate: slope.	Slight	Slight.
Aaron	Severe: low strength.	Severe: low strength.	Slight	Slight.
BnD*, BnE*:				
Berks	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Guernsey	Severe: low strength, slippage.	Severe: slope, low strength, slippage.	Moderate: slope.	Moderate: slope.
BpB Bethesda	Moderate: too clayey.	Moderate: too clayey.	Slight	Slight.
BpD Bethesda	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
BpF Bethesda	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.	Severe: slope.
BsD Brookside	Severe: low strength, slippage.	Severe: slope, low strength, slippage.	Moderate: slope.	Moderate: slope.
Ca Canadice	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness.
CcA Caneadea	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness.
CnB, CnC Coshocton	Severe: low strength.	Severe: low strength.	Slight	Slight.
CnD Coshocton	Severe: low strength.	Severe: slope, low strength.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

Table 9.--Woodland Harvesting and Regeneration Activities--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
DkC Dekalb	Moderate: depth to bedrock.	Moderate: slope, depth to bedrock.	Slight	Slight.
Dm*. Dumps				
FaB Fairpoint	Moderate: too clayey.	Moderate: too clayey.	Slight	Slight.
FaD, FaE Fairpoint	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
FcA, FcB Fitchville	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness.
GeC Germano	Slight	Moderate: slope.	Slight	Slight.
GeD Germano	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
GnB Gilpin	Slight	Slight	Slight	Slight.
GnC Gilpin	Slight	Moderate: slope.	Slight	Slight.
GnD Gilpin	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
GoC*: Gilpin	Slight	Moderate: slope.	Slight	Slight.
Coshocton	Severe: low strength.	Severe: low strength.	Slight	Slight.
GoD*: Gilpin	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Coshocton	Severe: low strength.	Severe: slope, low strength.	Moderate: slope.	Moderate: slope.
GpC*: Gilpin	Slight	Moderate: slope.	Slight	Slight.
Lowell	Severe: low strength.	Severe: low strength.	Slight	Slight.
GpD*: Gilpin	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

Table 9.--Woodland Harvesting and Regeneration Activities--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
GpD*:				
Lowell	Severe: low strength, slippage.	Severe: slope, low strength, slippage.	Moderate: slope.	Moderate: slope.
GsB, GsC	Severe: low strength.	Severe: low strength.	Slight	Slight.
Glenford				
GtC	Severe: low strength.	Severe: low strength.	Slight	Slight.
Guernsey				
GuD2, GuE2	Severe: low strength, slippage.	Severe: slope, low strength, slippage.	Moderate: slope.	Moderate: slope.
Guernsey				
HeD, HeE	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Hazleton				
HeF	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hazleton				
KeB	Severe: low strength.	Severe: low strength.	Slight	Slight.
Keene				
LnC	Severe: low strength.	Severe: low strength.	Slight	Slight.
Lowell				
LoD2, LoE2	Severe: low strength, slippage.	Severe: slope, low strength, slippage.	Moderate: slope.	Moderate: slope.
Lowell				
Me	Severe: wetness, low strength, flooding.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.	Severe: wetness, flooding.
Melvin				
MnB	Moderate: too clayey.	Moderate: too clayey.	Slight	Slight.
Morristown				
MnD	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
Morristown				
MoB	Moderate: too clayey.	Moderate: too clayey.	Slight	Slight.
Morristown				
MoD, MoE	Severe: slippage.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.
Morristown				
MrF	Severe: slope, slippage.	Severe: slope, slippage.	Severe: slope.	Severe: slope.
Morristown				
No	Severe: low strength.	Severe: low strength.	Slight	Slight.
Nolin				

See footnote at end of table.

Table 9.--Woodland Harvesting and Regeneration Activities--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
Np Nolin	Severe: flooding, low strength.	Severe: flooding, low strength.	Moderate: flooding.	Moderate: flooding.
OmB, OmC Omulga	Severe: low strength.	Severe: low strength.	Slight	Slight.
Or Orrville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
OsB Oshtemo	Slight	Slight	Slight	Slight.
Pe Peoga	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RcB Richland	Moderate: low strength.	Moderate: low strength.	Slight	Slight.
RcC Richland	Moderate: low strength.	Moderate: low strength, slope.	Slight	Slight.
RgD, RgE Rigley	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Tg Tioga	Moderate: flooding.	Moderate: flooding.	Slight	Slight.
Uc*: Udorthents.				
Pits.				
UpC2 Upshur	Severe: low strength.	Severe: low strength.	Slight	Slight.
UpD2 Upshur	Severe: low strength, slippage.	Severe: low strength, slope, slippage.	Moderate: slope.	Moderate: slope.
WhC Westmoreland	Moderate: low strength.	Moderate: slope, low strength.	Slight	Slight.
WhD, WhE Westmoreland	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WmE*: Westmoreland	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Coshocton	Severe: low strength.	Severe: low strength, slope.	Moderate: slope.	Moderate: slope.

See footnote at end of table.

Table 9.--Woodland Harvesting and Regeneration Activities--Continued

Soil name and map symbol	Haul roads	Log landings	Skid trails and logging areas	Site preparation and planting
WnE*:				
Westmoreland	Moderate: low strength, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
Dekalb	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WnF*:				
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Dekalb	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WoF*:				
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, too bouldery.
Dekalb	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, too bouldery.

* See descriptions of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Windbreaks and Environmental Plantings

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AaB, AbC2--- Aaron	---	Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush, eastern redcedar, arrowwood.	Green ash, Osageorange, Austrian pine.	Eastern white pine, pin oak.	---
BkC, BkD, BkE, BkF--- Berks	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
BmC*: Berks---	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Aaron---	---	Washington hawthorn, Amur honeysuckle, Amur privet, American cranberrybush, eastern redcedar, arrowwood.	Green ash, Osageorange, Austrian pine.	Eastern white pine, pin oak.	---
BnD*, BnE*: Berks---	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Guernsey---	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Eastern white pine, pin oak.	---

See footnote at end of table.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
BpB, BpD, BpF. Bethesda					
BsD. Brookside					
Ca. Canadice	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, white fir, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
CcA. Caneadea	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Green ash, Osageorange, Austrian pine.	Eastern white pine, pin oak.	---
CnB, CnC, CnD. Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce	Pin oak, eastern white pine.
DkC. Dekalb	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Dm*. Dumps					
FaB, FaD, FaE. Fairpoint					
FcA, FcB. Fitchville	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
GeC, GeD. Germano	Siberian peashrub	Washington hawthorn, Amur honeysuckle, lilac, autumn olive, radiant crabapple, eastern redcedar.	Jack pine, Virginia pine, Austrian pine, red pine, eastern white pine.	---	---

See footnote at end of table.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
GnB, GnC, GnD----Gilpin	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
GoC*, GoD*: Gilpin----------	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Coshocton-------	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce-----	Pin oak, eastern white pine.
GpC*, GpD*: Gilpin----------	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
Lowell----------	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Norway spruce-----	Austrian pine, pin oak, eastern white pine.
GsB, GsC--------- Glenford	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
GtC, GuD2, GuE2-- Guernsey	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Eastern white pine, pin oak.	---

See footnote at end of table.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
HeD, HeE, HeF---- Hazleton	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
KeB---------- Keene	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern whitecedar, Austrian pine, Washington hawthorn, white fir, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.
LnC, LoD2, LoE2-- Lowell	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Norway spruce-----	Austrian pine, pin oak, eastern white pine.
Me. Melvin					
MnB, MnD--------- Morristown	Siberian peashrub	Washington hawthorn, eastern redcedar, jack pine, Russian olive, Osageorange.	Honeylocust, northern catalpa.	---	---
MoB, MoD, MoE, MrF---------- Morristown	Siberian peashrub, Washington hawthorn.	Eastern redcedar, jack pine, Russian olive, Osageorange.	Honeylocust, northern catalpa.	---	---
No, Np---------- Nolin	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
OmB, OmC--------- Omulga	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Eastern white pine, pin oak.	---
Or---------- Orrville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

See footnote at end of table.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
OsB---------- Oshtemo	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn olive, Washington hawthorn, Amur honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
Pe---------- Peoga	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
RcB, RcC---------- Richland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
RgD, RgE---------- Rigley	---	American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	Eastern redcedar, Osageorange, northern whitecedar, Austrian pine.	Red pine, Norway spruce, eastern white pine.	---
Tg---------- Tioga	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
Uc*: Udorthents.					
Pits.					
UpC2, UpD2------- Upshur	---	American cranberrybush, Amur honeysuckle, Tatarian honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osageorange, Austrian pine.	Pin oak, eastern white pine.	---
WhC, WhD, WhE---- Westmoreland	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

See footnote at end of table.

Table 10.--Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
WmE*:					
Westmoreland	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce	Pin oak, eastern white pine.
WnE*, WnE*:					
Westmoreland	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern whitecedar, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Dekalb	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
WoF*:					
Westmoreland.					
Dekalb.					

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaB---Aaron	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
AbC2---Aaron	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
BkC---Berks	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
BkD---Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
BkE, BkF---Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
BmC*:					
Berks	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
Aaron	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
BnD*:					
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
BnE*:					
Berks	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
BpB---Bethesda	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Severe: droughty.
BpD---Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.

See footnote at end of table.

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BpF Bethesda	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
BsD Brookside	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Ca Canadice	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
CcA Caneadea	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
CnB Coshocton	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: wetness.
CnC Coshocton	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CnD Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
DkC Dekalb	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.	Severe: small stones.
Dm*. Dumps					
FaB Fairpoint	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Severe: droughty.
FaD Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: droughty, slope.
FaE Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: droughty, slope.
FcA, FcB Fitchville	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
GeC Germano	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
GeD Germano	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GnB Gilpin	Slight	Slight	Moderate: small stones, slope.	Slight	Moderate: thin layer.

See footnote at end of table.

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GnC--Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
GnD--Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
GoC*:					
Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
Coshocton	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
GoD*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
GpC*:					
Gilpin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.
Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
GpD*:					
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
GsB--Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Slight.
GsC--Glenford	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
GtC--Guernsey	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
GuD2--Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
GuE2--Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HeD--Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
HeE--Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HeF--Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
KeB--Keene	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
LnC--Lowell	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LoD2--Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
LoE2--Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Me--Melvin	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
MnB--Morristown	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: erodes easily.	Moderate: droughty.
MnD--Morristown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MoB--Morristown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, large stones.
MoD--Morristown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
MoE--Morristown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
MrF--Morristown	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
No--Nolin	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Np--Nolin	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.

See footnote at end of table.

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OmB Omulga	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
OmC Omulga	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Or Orrville	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
OsB Oshtemo	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Pe Peoga	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RcB Richland	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, large stones.
RcC Richland	Moderate: small stones, slope.	Moderate: slope, small stones.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, large stones, slope.
RgD Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
RgE Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tg Tioga	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Uc*: Udorthents.					
Pits.					
UpC2 Upshur	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
UpD2 Upshur	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
WhC Westmoreland	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
WhD Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
WhE Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

See footnote at end of table.

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WmE*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
WnE*, WnF*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Dekalb	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.
WoF*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Dekalb	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Wildlife Habitat

(See text for definitions of “good,” “fair,” “poor,” and “very poor.” Absence of an entry indicates that the soil was not rated)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hard-wood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaB---------- Aaron	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AbC2---------- Aaron	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BkC---------- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BkD---------- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BkE---------- Berks	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BkF---------- Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
BmC*:										
Berks----------	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Aaron----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BnD*:										
Berks----------	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Guernsey--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BnE*:										
Berks----------	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Guernsey--------	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BpB---------- Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.
BpD, BpF--------- Bethesda	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
BsD---------- Brookside	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ca---------- Canadice	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
CcA---------- Caneadea	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

See footnote at end of table.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CnB--Coshocton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CnC--Coshocton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CnD--Coshocton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DkC--Dekalb	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Dm*. Dumps										
FaB--Fairpoint	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
FaD--Fairpoint	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
FaE--Fairpoint	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
FcA--Fitchville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
FcB--Fitchville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeC--Germano	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GeD--Germano	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GnB--Gilpin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GnC--Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
GnD--Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
GoC*:										
Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Coshocton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GoD*:										
Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Coshocton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GpC*:										
Gilpin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GpD*:										
Gilpin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GsB Glenford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GsC Glenford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GtC Guernsey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GuD2 Guernsey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GuE2 Guernsey	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HeD Hazleton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
HeE Hazleton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
HeF Hazleton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
KeB Keene	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LnC Lowell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoD2 Lowell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LoE2 Lowell	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Me Melvin	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MnB Morristown	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
MnD Morristown	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MoB---- Morristown	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.
MoD, MoE, MrF---- Morristown	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
No---- Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Np---- Nolin	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Fair	Very poor.
OmB---- Omulga	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OmC---- Omulga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Or---- Orrville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
OsB---- Oshtemo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pe---- Peoga	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
RcB---- Richland	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RcC---- Richland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RgD---- Rigley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RgE---- Rigley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Tg---- Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Uc*: Udorthents.										
Pits.										
UpC2---- Upshur	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
UpD2---- Upshur	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WhC---- Westmoreland	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WhD---- Westmoreland	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WhE---------- Westmoreland	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
WmE*:										
Westmoreland----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Coshocton-------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
WnE*:										
Westmoreland----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Dekalb----------	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
WnF*:										
Westmoreland----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Dekalb----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
WoF*:										
Westmoreland----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Dekalb----------	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaB--Aaron	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
AbC2--Aaron	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
BkC--Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
BkD, BkE, BkF--Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BmC*:						
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
Aaron	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: wetness, slope.
BnD*, BnE*:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Guernsey	Severe: wetness, slope, slippage.	Severe: slope, slippage, shrink-swell.	Severe: wetness, slope, shrink-swell.	Severe: slope, slippage, shrink-swell.	Severe: shrink-swell, low strength, slope.	Severe: slope.
BpB--Bethesda	Moderate: dense layer, large stones.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: droughty.
BpD, BpF--Bethesa	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
BsD--Brookside	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, slippage, shrink-swell.	Severe: slope.
Ca--Canadice	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.

See footnote at end of table.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CcA--Caneadea	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
CnB--Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
CnC--Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
CnD--Coshocton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
DkC--Dekalb	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, large stones.	Severe: small stones.
Dm*. Dumps						
FaB--Fairpoint	Slight	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: droughty.
FaD, FaE--Fairpoint	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
FcA, FcB--Fitchville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
GeC--Germano	Moderate: slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
GeD--Germano	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GnB--Gilpin	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Moderate: frost action.	Moderate: thin layer.
GnC--Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
GnD--Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
GoC*: Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.

See footnote at end of table.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
GoC*:						
Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
GoD*:						
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Coshocton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
GpC*:						
Gilpin	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
GpD*:						
Gilpin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
GsB Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
GsC Glenford	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
GtC Guernsey	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: slope, wetness.
GuD2, GuE2 Guernsey	Severe: wetness, slope, slippage.	Severe: slope, slippage, shrink-swell.	Severe: wetness, slope, shrink-swell.	Severe: slope, slippage, shrink-swell.	Severe: shrink-swell, low strength, slope.	Severe: slope.
HeD, HeE, HeF Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
KeB Keene	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.

See footnote at end of table.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LnC--Lowell	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
LoC2, LoE2--Lowell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Me--Melvin	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.
MnB--Morristown	Moderate: dense layer.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Moderate: droughty.
MnD--Morristown	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope.
MoB--Morristown	Slight	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Moderate: small stones, large stones.
MoD, MoE, MrF--Morristown	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope.
No--Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Np--Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
OmB--Omulga	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
OmC--Omulga	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Or--Orrville	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
OsB--Oshtemo	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
Pe--Peoga	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.

See footnote at end of table.

Table 13.--Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
RcB---------- Richland	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: small stones, large stones.
RcC---------- Richland	Moderate: wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: small stones, large stones, slope.
RgD, RgE--------- Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tg---------- Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Uc*: Udorthents.						
Pits.						
UpC2---------- Upshur	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, low strength.	Moderate: slope.
UpD2---------- Upshur	Severe: slope, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: slope, shrink-swell, slippage.	Severe: shrink-swell, low strength, slope.	Severe: slope.
WhC---------- Westmoreland	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
WhD, WhE--------- Westmoreland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WmE*: Westmoreland----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Coshocton-------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
WnE*, WnF*, WoF*: Westmoreland----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Dekalb----------	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaB Aaron	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Poor: too clayey, hard to pack.
AbC2 Aaron	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
BkC Berks	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: small stones, area reclaim.
BkD, BkE, BkF Berks	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: slope, small stones, area reclaim.
BmC*: Berks	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: small stones, area reclaim.
Aaron	Severe: wetness, percs slowly.	Severe: slope.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness, slope.	Poor: too clayey, hard to pack.
BnD*, BnE*: Berks	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: slope, small stones, area reclaim.
Guernsey	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
BpB Bethesda	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
BpD, BpF Bethesda	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.

See footnote at end of table.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BsD--Brookside	Severe: slope, percs slowly, wetness.	Severe: slope, wetness, slippage.	Severe: slope, too clayey, slippage.	Severe: slope, slippage.	Poor: slope, too clayey, hard to pack.
Ca--Canadice	Severe: wetness, percs slowly.	Moderate: excess humus.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
CcA--Caneadea	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
CnB--Coshocton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Poor: too clayey, hard to pack.
CnC--Coshocton	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
CnD--Coshocton	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
DkC--Dekalb	Severe: depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
Dm*. Dumps					
FaB--Fairpoint	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
FaD, FaE--Fairpoint	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
FcA, FcB--Fitchville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
GeC--Germano	Severe: thin layer, seepage.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: area reclaim, small stones.
GeD--Germano	Severe: thin layer, seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: area reclaim, small stones, slope.
GnB--Gilpin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.

See footnote at end of table.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GnC--Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
GnD--Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
GoC*:					
Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Coshocton	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
GoD*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Coshocton	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
GpC*:					
Gilpin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
GpD*:					
Gilpin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
GsB--Glenford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
GsC--Glenford	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.

See footnote at end of table.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GtC---------- Guernsey	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
GuD2, GuE2------- Guernsey	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HeD, HeE, HeF---- Hazleton	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
KeB---------- Keene	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Poor: too clayey, hard to pack.
LnC---------- Lowell	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
LoD2, LoE2------- Lowell	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Me---------- Melvin	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
MnB---------- Morristown	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
MnD---------- Morristown	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
MoB---------- Morristown	Severe: percs slowly, unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Severe: unstable fill.	Poor: small stones.
MoD, MoE, MrF---- Morristown	Severe: slope, percs slowly, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
No, Np---------- Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
OmB---------- Omulga	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.

See footnote at end of table.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OmC---------- Omulga	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Or---------- Orrville	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
OsB---------- Oshtemo	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
Pe---------- Peoga	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
RcB---------- Richland	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, small stones.
RcC---------- Richland	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, small stones, slope.
RgD, RgE--------- Rigley	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Tg---------- Tioga	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: thin layer.
Uc*: Udorthents.					
Pits.					
UpC2---------- Upshur	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
UpD2---------- Upshur	Severe: slope, percs slowly, slippage.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope, slippage.	Poor: too clayey, hard to pack, slope.
WhC---------- Westmoreland	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
WhD, WhE--------- Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.

See footnote at end of table.

Table 14.--Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WmE*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Coshocton	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
WnE*, WnF*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Dekalb	Severe: slope, depth to rock, poor filter.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
WoF*:					
Westmoreland	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Dekalb	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: slope, small stones, area reclaim.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Construction Materials

(Some terms that describe restrictive features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AaB, AbC2-------- Aaron	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
BkC-------------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BkD-------------- Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BkE, BkF--------- Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
BmC*: Berks----------- Aaron----------- BnD*: Berks----------- Guernsey-------- BnE*: Berks----------- Guernsey-------- BpB-------------- Bethesda	 Poor: area reclaim. Poor: shrink-swell, low strength. Poor: area reclaim. Poor: low strength, shrink-swell. Poor: area reclaim, slope. Poor: low strength, slope, shrink-swell. Fair: large stones.	 Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines.	 Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines. Improbable: excess fines.	 Poor: small stones. Poor: too clayey. Poor: small stones, slope. Poor: small stones, slope, too clayey. Poor: small stones, slope. Poor: small stones, slope, too clayey. Poor: area reclaim, small stones.
BpD-------------- Bethesda	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BpF---------- Bethesda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
BsD---------- Brookside	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
Ca---------- Canadice	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
CcA---------- Caneadea	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CnB, CnC--------- Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CnD---------- Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
DkC---------- Dekalb	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Dm*. Dumps				
FaB---------- Fairpoint	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
FaD---------- Fairpoint	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
FaE---------- Fairpoint	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
FcA, FcB--------- Fitchville	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GeC---------- Germano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GeD---------- Germano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
GnB, GnC--------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
GnD---------- Gilpin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
GoC*:				
Gilpin----------	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Coshocton-------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GoD*:				
Gilpin----------	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Coshocton-------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
GpC*:				
Gilpin----------	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Lowell----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
GpD*:				
Gilpin----------	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Lowell----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
GsB---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GsC---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
GtC---------- Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
GuD2---------- Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
GuE2---------- Guernsey	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.

See footnote at end of table.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
HeD---Hazleton	Fair: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
HeE---Hazleton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HeF---Hazleton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
KeB---Keene	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, area reclaim.
LnC---Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
LoD2---Lowell	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
LoE2---Lowell	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Me---Melvin	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MnB---Morristown	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
MnD---Morristown	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
MoB---Morristown	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
MoD---Morristown	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
MoE, MrF---Morristown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
No, Np---Nolin	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
OmB---Omulga	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

See footnote at end of table.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
OmC---------- Omulga	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Or---------- Orrville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
OsB---------- Oshtemo	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Pe---------- Peoga	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RcB, RcC--------- Richland	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
RgD---------- Rigley	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RgE---------- Rigley	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Tg---------- Tioga	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
Uc*: Udorthents.				
Pits.				
UpC2---------- Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UpD2---------- Upshur	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
WhC---------- Westmoreland	Fair: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
WhD---------- Westmoreland	Fair: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WhE---------- Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WmE*: Westmoreland----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

Table 15.--Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
WmE*:				
Coshocton	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
WnE*, WnF*, WoF*:				
Westmoreland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Dekalb	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
AaB---Aaron	Moderate: depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
AbC2---Aaron	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
BkC, BkD, BkE, BkF---Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
BmC*:						
Berks----	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Aaron----	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
BnD*, BnE*:						
Berks----	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
Guernsey----	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, slippage.	Slope, erodes easily, percs slowly.
BpB---Bethesda	Moderate: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
BpD, BpF---Bethesda	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, slippage.	Large stones, slope, droughty.
BsD---Brookside	Severe: slope, slippage.	Moderate: hard to pack, wetness, thin layer.	Severe: no water.	Slope---	Slope, erodes easily, slippage.	Slope, erodes easily.
Ca---Canadice	Slight---	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly---	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
CcA---Caneadea	Slight---	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.

See footnote at end of table.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
CnB---------- Coshocton	Moderate: seepage, slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
CnC, CnD--------- Coshocton	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
DkC---------- Dekalb	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.
Dm*. Dumps						
FaB---------- Fairpoint	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones, erodes easily.	Large stones, erodes easily.
FaD, FaE--------- Fairpoint	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
FcA---------- Fitchville	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
FcB---------- Fitchville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
GeC, GeD--------- Germano	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, area reclaim.	Large stones, slope, droughty.
GnB---------- Gilpin	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Depth to rock, large stones.	Depth to rock, large stones.
GnC, GnD--------- Gilpin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
GoC*, GoD*:						
Gilpin----------	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Coshocton-------	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
GpC*:						
Gilpin----------	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.

See footnote at end of table.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
GpC*:						
Lowell	Moderate: depth to rock.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
GpD*:						
Gilpin	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock, large stones.	Slope, depth to rock, large stones.
Lowell	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
GsB---- Glenford	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
GsC---- Glenford	Severe: slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily.
GtC---- Guernsey	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
GuD2, GuE2---- Guernsey	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, slippage.	Slope, erodes easily, percs slowly.
HeD, HeE---- Hazleton	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
HeF---- Hazleton	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
KeB---- Keene	Moderate: seepage, slope.	Moderate: thin layer, piping, hard to pack.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
LnC---- Lowell	Moderate: depth to rock.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
LoD2, LoE2---- Lowell	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Me---- Melvin	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
MnB---- Morristown	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones, erodes easily.	Large stones, erodes easily.
MnD---- Morristown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.

See footnote at end of table.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
MoB---------- Morristown	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
MoD, MoE, MrF---- Morristown	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
No, Np---------- Nolin	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
OmB---------- Omulga	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
OmC---------- Omulga	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Or---------- Orrville	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
OsB---------- Oshtemo	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing	Favorable.
Pe---------- Peoga	Slight---------	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
RcB---------- Richland	Moderate: seepage, slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
RcC---------- Richland	Severe: slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
RgD, RgE--------- Rigley	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.
Tg---------- Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, droughty.
Uc*: Udorthents.						
Pits.						
UpC2, UpD2------- Upshur	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
WhC, WhD, WhE---- Westmoreland	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.

See footnote at end of table.

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
WmE*:						
Westmoreland	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Coshocton	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
WnE*, WnF*:						
Westmoreland	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Dekalb	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, droughty.
WoF*:						
Westmoreland	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope.
Dekalb	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--Engineering Index Properties

(The symbol < mean less than; > means more than. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AaB---------- Aaron	0-9	Silt loam------	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	70-90	20-35	5-15
	9-40	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	45-70	22-43
	40-59	Silty clay loam, silty clay, channery silty clay.	CL, CH	A-7	0-10	75-90	75-90	70-90	65-90	45-65	22-40
	59-63	Weathered bedrock.	---	---	---	---	---	---	---	---	---
AbC2---------- Aaron	0-9	Silty clay loam	CL	A-6, A-7, A-4	0	95-100	95-100	90-100	80-95	30-45	8-22
	9-40	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	45-70	22-43
	40-56	Silty clay loam, silty clay, channery silty clay.	CL, CH	A-7	0-10	75-90	75-90	70-90	65-90	45-65	22-40
	56-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BkC, BkD--------- Berks	0-7	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	7-20	Channery loam, very channery silt loam, extremely channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	20-28	Channery loam, very channery silt loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	28-30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BkE, BkF--------- Berks	0-3	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	3-24	Channery silt loam, very channery loam, extremely channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	24-36	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BmC*:											
Berks	0-7	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	7-16	Channery loam, very channery silt loam, extremely channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	16-22	Channery loam, very channery loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	22-25	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Aaron	0-9	Silt loam	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	70-90	20-35	5-15
	9-50	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	90-100	90-100	85-100	80-100	45-70	22-43
	50-60	Silty clay loam, silty clay, channery silty clay loam.	CL, CH	A-7	0-10	75-90	75-90	70-90	65-90	45-65	22-40
	60-62	Weathered bedrock.	---	---	---	---	---	---	---	---	---
BnD*, BnE*:											
Berks	0-4	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	4-23	Channery silt loam, very channery silt loam, extremely channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	23-28	Channery loam, very channery loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	28-30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Guernsey	0-8	Silt loam	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	70-90	25-40	4-14
	8-20	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7, A-6	0-2	90-100	80-100	75-100	70-100	30-55	10-30
	20-60	Silty clay, channery silty clay loam, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	60-80	Clay, silty clay, channery silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BpB, BpD, BpF---- Bethesda	0-4	Channery silty clay loam.	GC, SC, CL	A-6, A-7	5-20	65-90	50-80	45-80	35-75	35-50	12-24
	4-80	Very channery clay loam, very channery silty clay loam, extremely channery silty clay loam.	GM-GC, ML, CL, GM	A-4, A-6, A-7, A-2	10-30	45-80	25-65	25-65	20-60	24-50	3-23
BsD---------- Brookside	0-8	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	75-100	70-95	30-50	10-28
	8-60	Silty clay, silty clay loam, channery silty clay loam.	CH, CL	A-7, A-6	0-15	80-95	65-90	60-85	55-85	35-70	15-40
	60-80	Channery silty clay, clay, silty clay.	CH, CL	A-6, A-7	5-25	70-90	60-75	55-75	50-70	35-65	22-44
Ca---------- Canadice	0-7	Silty clay loam	ML, MH, OL, OH	A-7	0	100	95-100	85-100	65-95	40-65	10-25
	7-45	Silty clay, clay, silty clay loam.	CL, CH, MH, ML	A-7	0	100	95-100	85-100	70-95	45-65	20-30
	45-80	Silty clay, clay, silty clay loam.	CL, CH, MH, ML	A-7	0	100	95-100	85-100	70-95	45-65	20-30
CcA---------- Caneadea	0-9	Silty clay loam	CL	A-7, A-6	0	100	90-100	90-100	80-100	35-50	15-25
	9-55	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	95-100	90-100	85-100	40-60	18-34
	55-80	Silty clay, silty clay loam.	CH, CL	A-7, A-6	0	100	95-100	90-100	85-100	35-55	12-28
CnB, CnC, CnD---- Coshocton	0-7	Silt loam------	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	7-14	Silt loam, channery silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	14-45	Silty clay loam, silty clay, channery silty clay loam.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	45-80	Channery loam, channery clay loam, very channery clay loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DkC---------- Dekalb	0-8	Channery loam	SM, GM, ML, CL-ML	A-2, A-4, A-1	0-30	50-90	45-80	40-75	20-55	10-32	NP-10
	8-27	Channery sandy loam, very channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	27-32	Extremely channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	32-36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Dm*. Dumps											
FaB, FaD, FaE---- Fairpoint	0-12	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	70-95	60-95	35-50	12-24
	12-80	Very channery silty clay loam, extremely channery silty clay loam, very channery clay loam.	GC, CL, CL-ML, SC	A-4, A-6, A-7, A-2	15-30	55-75	25-65	20-65	15-60	25-50	4-24
FcA, FcB--------- Fitchville	0-10	Silt loam------	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	24-40	4-16
	10-50	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0	100	100	90-100	80-100	28-50	5-23
	50-80	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-100	20-40	3-18
GeC, GeD--------- Germano	0-10	Fine sandy loam	SM, SC-SM, ML	A-2-4, A-4	0-10	85-100	80-100	50-90	25-55	<20	NP-4
	10-26	Sandy loam, fine sandy loam, channery fine sandy loam.	SM, SC-SM, GM	A-2-4, A-1-b, A-4	0-20	65-100	50-95	30-80	15-50	<30	NP-7
	26-33	Very channery fine sandy loam, extremely channery fine sandy loam, channery sandy loam.	SM, SM-SC	A-2-4, A-1, A-3	0-30	50-85	30-75	20-70	10-35	<20	NP-5
	33-37	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GnB, GnC, GnD----	0-6	Silt loam------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
Gilpin	6-24	Silt loam, silty clay loam, channery silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	24-30	Channery loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	30-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GoC*, GoD*:											
Gilpin----------	0-8	Silt loam------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	8-27	Channery silt loam, silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	27-33	Channery silt loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	33-39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Coshocton-------	0-7	Silt loam------	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	7-15	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	15-45	Silty clay loam, channery silty clay loam.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	45-49	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GpC*, GpD*:											
Gilpin----------	0-4	Silt loam------	CL, CL-ML	A-4, A-6	0-5	80-95	75-90	70-85	65-80	20-40	4-15
	4-21	Channery silt loam, silt loam, silty clay loam.	GC, SC, CL, CL-ML	A-2, A-4, A-6	0-30	50-95	45-90	35-85	30-80	20-40	4-15
	21-24	Channery silt loam, very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-1, A-2, A-4, A-6	0-35	25-55	20-50	15-45	15-40	20-40	4-15
	24-26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GpC*, GpD*:											
Lowell----------	0-4	Silt loam------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	4-55	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	55-60	Clay, silty clay.	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
	60-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
GsB, GsC---------	0-10	Silt loam------	CL-ML, CL, ML	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
Glenford	10-45	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	45-57	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	57-80	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
GtC----------	0-8	Silt loam------	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	70-90	25-40	4-14
Guernsey	8-15	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7, A-6	0-2	90-100	80-100	75-100	70-100	30-55	10-30
	15-45	Silty clay, clay, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	45-64	Clay, silty clay, silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
	64-66	Weathered bedrock.	---	---	---	---	---	---	---	---	---
GuD2, GuE2-------	0-9	Silty clay loam	CL	A-4, A-6, A-7	0-2	90-100	80-100	75-100	70-95	25-45	8-22
Guernsey	9-40	Silty clay, clay, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	40-80	Silty clay, clay, silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
	80-83	Weathered bedrock.	---	---	---	---	---	---	---	---	---
HeD----------	0-7	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-15	60-85	60-80	60-75	35-55	---	---
Hazleton	7-30	Very channery sandy loam, channery loam, very channery loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	30-42	Extremely channery sandy loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	55-80	35-75	25-65	15-50	<30	NP-8
	42-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HeE, HeF--------- Hazleton	0-3	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-15	60-85	60-80	60-75	35-55	---	---
	3-34	Channery sandy loam, channery loam, very channery sandy loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	34-66	Channery loam, very channery sandy loam, extremely channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	55-80	35-75	25-65	15-50	<30	NP-8
	66-68	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
KeB-------------- Keene	0-10	Silt loam------	CL, CL-ML, ML	A-4, A-6	0	95-100	90-100	85-100	70-95	25-36	4-12
	10-30	Silt loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4	0	95-100	90-100	85-100	75-100	25-40	6-18
	30-50	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0-5	95-100	75-100	70-95	65-90	30-55	10-28
	50-80	Channery silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	5-20	65-100	55-100	55-90	50-85	30-55	10-28
LnC-------------- Lowell	0-7	Silt loam------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	22-32	3-10
	7-44	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	44-52	Clay, silty clay.	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
	52-54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
LoD2, LoE2------- Lowell	0-6	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	85-100	34-42	15-22
	6-48	Silty clay, clay, silty clay loam.	CL, CH, MH	A-7, A-6	0	100	95-100	90-100	85-100	35-65	15-32
	48-64	Clay, channery silty clay.	CH, MH, CL	A-7	0-10	95-100	90-100	85-100	75-100	45-75	20-40
	64-66	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Me--------------- Melvin	0-6	Silt loam------	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	6-40	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	40-80	Stratified silt loam to loamy sand.	CL, ML, SM, SC	A-4, A-1, A-2	0-2	45-100	65-100	40-85	15-75	15-35	NP-10

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MnB, MnD--- Morristown	0-12	Silty clay loam	CL	A-7, A-6	0-5	90-100	80-100	70-95	60-95	35-50	12-24
	12-80	Extremely channery silty clay loam, very channery clay loam.	GM-GC, GC, CL, CL-ML	A-7, A-6, A-4, A-2	10-25	35-75	25-65	20-65	15-60	25-50	4-24
MoB, MoD, MoE--- Morristown	0-7	Channery silty clay loam.	CL, GC, SC	A-6, A-7	5-20	70-95	50-80	50-75	40-70	35-50	12-24
	7-80	Very channery silty clay loam, extremely channery silty clay loam.	GC, CL, CL-ML, GM-GC	A-7, A-6, A-4, A-2	10-25	35-75	25-65	20-65	15-60	25-50	4-24
MrF--- Morristown	0-5	Channery silt loam.	SC-SM, CL-ML, GC, SC	A-4, A-6	5-20	70-95	50-80	45-75	35-65	20-40	4-18
	5-80	Very channery silt loam, extremely channery silty clay loam.	GC, CL, CL-ML, GM-GC	A-7, A-6, A-4, A-2	10-25	35-75	25-65	20-65	15-60	25-50	4-24
No, Np--- Nolin	0-11	Silt loam---	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	11-40	Silt loam, loam	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
	40-80	Loam, silt loam, gravelly loam.	ML, CL, GM, CL-ML	A-4, A-6	0-10	50-100	50-100	40-95	35-95	<30	NP-15
OmB, OmC--- Omulga	0-9	Silt loam---	ML, CL-ML, CL	A-4, A-6	0	95-100	90-100	85-100	65-90	25-35	5-15
	9-26	Silty clay loam, silt loam.	CL, CL-ML, ML	A-4, A-6, A-7	0	95-100	90-100	85-100	65-100	25-45	5-20
	26-40	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-4	0	85-100	80-100	75-95	60-90	20-40	5-20
	40-70	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	85-100	80-100	75-95	70-90	20-45	5-20
	70-80	Silty clay loam, silty clay.	CL	A-6, A-7	0	80-100	75-100	65-95	50-90	30-50	15-30
Or--- Orrville	0-10	Silt loam---	ML, CL-ML, CL	A-4	0	100	90-100	85-100	60-80	20-35	3-10
	10-31	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6	0-2	95-100	75-100	70-95	50-90	20-40	2-16
	31-80	Sandy loam, gravelly sandy loam, silt loam.	ML, CL, SM, SC	A-4, A-2, A-1	0-2	95-100	65-100	40-85	15-75	15-35	NP-10

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
OsB----------	0-10	Loam----------	ML	A-4	0	95-100	85-95	75-90	50-70	25-35	4-10
Oshtemo	10-40	Sandy loam, sandy clay loam, gravelly sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	95-100	60-95	60-85	25-45	12-30	2-16
	40-80	Stratified sandy loam to loamy sand.	SM, SP-SM	A-2	0	85-95	60-95	55-70	10-30	---	NP
Pe----------	0-10	Silt loam------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
Peoga	10-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-100	35-50	20-30
	60-80	Stratified silty clay loam to silt loam.	CL, ML	A-6, A-7	0	100	100	90-100	70-95	35-50	10-25
RcB, RcC---------	0-12	Silt loam------	ML, CL, CL-ML	A-4, A-6	0-10	90-100	80-95	70-95	50-90	16-35	3-20
Richland	12-52	Silt loam, clay loam, gravelly clay loam.	CL, SC, SM, ML	A-4, A-6, A-7	5-15	80-95	65-95	55-90	35-75	30-45	9-18
	52-80	Gravelly clay loam, gravelly loam, very gravelly loam.	CL, GC, SM, GM	A-4, A-6, A-7	5-15	65-90	40-85	40-85	35-75	30-45	9-18
RgD, RgE---------	0-4	Loam----------	SM, ML, SC-SM, CL-ML	A-2, A-4	0-10	80-95	75-90	55-80	25-65	<30	NP-7
Rigley	4-44	Channery sandy loam, channery loam, loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	44-75	Very channery sandy loam, extremely channery sandy loam, channery sandy loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
	75-80	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Tg----------	0-10	Silt loam------	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
Tioga	10-36	Sandy loam, loam, fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	36-80	Stratified gravelly sandy loam to silt loam.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2
Uc*:											
Udorthents.											
Pits.											

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
UpC2---------- Upshur	0-7	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	7-42	Silty clay, clay.	MH, CH, CL	A-7	0	95-100	95-100	90-100	85-100	45-70	20-40
	42-64	Silty clay loam, silty clay, silt loam.	CL, ML, MH, CH	A-6, A-7	0	80-100	65-100	60-100	55-95	35-55	11-25
	64-66	Weathered bedrock.	---	---	---	---	---	---	---	---	---
UpD2---------- Upshur	0-4	Silty clay loam	CL, ML	A-6, A-7	0	95-100	95-100	90-100	80-95	35-50	11-25
	4-44	Silty clay, clay.	MH, CH, CL	A-7	0	95-100	95-100	90-100	85-100	45-70	20-40
	44-54	Silty clay loam, silty clay, silt loam.	CL, ML, MH, CH	A-6, A-7	0	80-100	65-100	60-100	55-95	35-55	11-25
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---
WhC, WhD, WhE---- Westmoreland	0-4	Silt loam------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	4-40	Silt loam, channery loam, channery silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	40-50	Very channery loam, very channery silt loam, very channery clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	50-52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WmE*: Westmoreland----	0-7	Silt loam------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	7-40	Silty clay loam, channery loam, channery silty clay loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	40-50	Very channery loam, very channery silt loam, very channery silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	50-52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WmE*:											
Coshocton-------	0-5	Silt loam------	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	5-24	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	24-42	Channery clay loam, silty clay.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	42-50	Channery silty clay loam, silty clay, very channery loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	50-54	Weathered bedrock.	---	---	---	---	---	---	---	---	---
WnE*, WnF*:											
Westmoreland----	0-4	Loam----------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	60-95	<35	NP-10
	4-32	Clay loam, channery clay loam, loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	22-45	2-20
	32-48	Very channery loam, very channery silt loam, extremely channery loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	48-50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Dekalb----------	0-4	Channery fine sandy loam.	SM, GM, ML, CL-ML	A-2, A-4, A-1	0-30	50-90	45-80	40-75	20-55	10-32	NP-10
	4-32	Channery fine sandy loam, channery sandy loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-80	40-75	20-55	15-32	NP-9
	32-37	Extremely channery sandy loam, flaggy sandy loam, very flaggy loamy sand.	SM, GM, SC, GC	A-2, A-4, A-1	10-50	45-85	25-75	20-65	15-40	15-32	NP-9
	37-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
WoF*:											
Westmoreland----	0-3	Loam----------	ML, CL, GM	A-4, A-6	5-15	65-85	55-80	50-70	45-55	20-40	4-15
	3-32	Silty clay loam, loam, channery silt loam.	CL, ML, GM, GC	A-4, A-6, A-7	0-15	65-100	55-95	50-90	45-85	20-45	2-20
	32-42	Very channery loam, very channery silt loam, channery silty clay loam.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	25-95	20-95	15-90	15-80	20-40	2-20
	42-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

Table 17.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
WoF*:											
Dekalb	0-3	Channery loam	SM, GM, ML, CL-ML	A-2, A-4, A-1	15-30	50-90	45-80	40-75	20-55	10-32	NP-10
	3-31	Very channery loam, channery loam, very channery sandy loam.	SM, GM, ML, GM-GC	A-2, A-4, A-1	5-40	50-85	40-75	40-75	20-55	15-32	NP-9
	31-33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 18.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under “Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AaB	0-9	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-7.8	Low	0.37	3	1-3
Aaron	9-40	35-60	1.30-1.60	0.06-0.2	0.14-0.18	5.1-7.8	High	0.28		
	40-59	35-60	1.35-1.65	0.06-0.2	0.10-0.14	5.1-8.4	High	0.28		
	59-63	---	---	---	---	---	---	---		
AbC2	0-9	27-35	1.20-1.40	0.6-2.0	0.18-0.22	4.5-7.8	Moderate	0.37	3	.5-2
Aaron	9-40	35-60	1.30-1.60	0.06-0.2	0.14-0.18	5.1-7.8	High	0.28		
	40-56	35-60	1.35-1.65	0.06-0.2	0.10-0.14	5.1-8.4	High	0.28		
	56-60	---	---	---	---	---	---	---		
BkC, BkD	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low	0.17	3	.5-3
Berks	7-20	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	20-28	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	28-30	---	---	---	---	---	---	---		
BkE, BkF	0-3	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low	0.17	3	.5-3
Berks	3-24	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	24-36	---	---	---	---	---	---	---		
BmC*:										
Berks	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low	0.17	3	.5-3
	7-16	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	16-22	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	22-25	---	---	---	---	---	---	---		
Aaron	0-9	10-27	1.20-1.40	0.6-2.0	0.19-0.23	4.5-7.8	Low	0.37	3	1-3
	9-50	35-60	1.30-1.60	0.06-0.2	0.14-0.18	5.1-7.8	High	0.28		
	50-60	35-60	1.35-1.65	0.06-0.2	0.10-0.14	5.1-7.8	High	0.28		
	60-62	---	---	---	---	---	---	---		
BnD*, BnE*:										
Berks	0-4	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low	0.17	3	.5-3
	4-23	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	23-28	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low	0.17		
	28-30	---	---	---	---	---	---	---		
Guernsey	0-8	13-27	1.30-1.50	0.6-2.0	0.19-0.24	4.5-7.3	Low	0.43	3	1-3
	8-20	22-38	1.35-1.55	0.2-2.0	0.15-0.21	4.5-6.0	Moderate	0.43		
	20-60	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High	0.32		
	60-80	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High	0.32		
BpB, BpD, BpF	0-4	27-35	1.45-1.65	0.2-0.6	0.05-0.16	3.6-5.5	Low	0.28	5	<.5
Bethesda	4-80	18-35	1.60-1.90	0.2-0.6	0.04-0.10	3.6-5.5	Low	0.32		
BsD	0-8	27-40	1.20-1.50	0.6-2.0	0.18-0.23	5.1-7.8	Moderate	0.37	5	1-3
Brookside	8-60	35-55	1.45-1.70	0.2-0.6	0.07-0.14	5.1-7.8	High	0.37		
	60-80	30-60	1.45-1.75	0.2-0.6	0.05-0.12	5.6-8.4	High	0.37		
Ca	0-7	27-40	1.35-1.55	0.2-2.0	0.17-0.21	4.5-6.5	Moderate	0.49	5	2-4
Canadice	7-45	35-60	1.40-1.75	<0.06	0.12-0.17	5.1-7.8	Moderate	0.28		
	45-80	35-60	1.40-1.50	<0.06	0.13-0.17	6.6-8.4	Moderate	0.28		
CcA	0-9	27-35	1.30-1.50	0.2-0.6	0.21-0.23	4.5-7.3	Moderate	0.43	3	2-4
Caneadea	9-55	35-60	1.35-1.70	<0.06	0.10-0.13	4.5-7.8	Moderate	0.32		
	55-80	35-55	1.45-1.75	<0.06	0.10-0.14	6.6-8.4	Moderate	0.32		

See footnote at end of table.

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
CnB, CnC, CnD----	0-7	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low	0.37	5	1-3
Coshocton	7-14	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-5.5	Moderate	0.37		
	14-45	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate	0.37		
	45-80	24-36	1.45-1.70	0.06-0.6	0.08-0.12	4.5-6.0	Moderate	0.28		
DkC----------	0-8	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low	0.17	2	2-4
Dekalb	8-27	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low	0.17		
	27-32	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low	0.17		
	32-36	---	---	---	---	---	---	---		
Dm*.										
Dumps										
FaB, FaD, FaE----	0-12	27-40	1.40-1.65	0.2-0.6	0.12-0.18	5.6-7.3	Moderate	0.43	2	.5-2
Fairpoint	12-80	18-35	1.60-1.80	0.2-0.6	0.03-0.10	5.6-7.3	Moderate	0.32		
FcA, FcB----------	0-10	16-27	1.30-1.45	0.6-2.0	0.17-0.21	4.5-7.3	Low	0.37	5	2-3
Fitchville	10-50	20-35	1.45-1.70	0.2-0.6	0.15-0.19	4.5-7.3	Moderate	0.37		
	50-80	16-30	1.40-1.65	0.2-2.0	0.14-0.18	5.6-7.8	Low	0.37		
GeC, GeD----------	0-10	5-15	1.20-1.40	2.0-6.0	0.13-0.19	5.1-6.0	Low	0.24	4	.5-3
Germano	10-26	8-18	1.30-1.60	2.0-6.0	0.07-0.15	4.5-6.0	Low	0.17		
	26-33	5-15	1.20-1.40	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.15		
	33-37	---	---	---	---	---	---	---		
GnB, GnC, GnD----	0-6	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	.5-4
Gilpin	6-24	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	24-30	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	30-35	---	---	---	---	---	---	---		
GoC*, GoD*:										
Gilpin----------	0-8	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	.5-4
	8-27	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	27-33	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	33-39	---	---	---	---	---	---	---		
Coshocton-------	0-7	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low	0.37	5	1-3
	7-15	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-5.5	Moderate	0.37		
	15-45	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate	0.37		
	45-49	---	---	---	---	---	---	---		
GpC*, GpD*:										
Gilpin----------	0-4	15-27	1.20-1.40	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.32	3	.5-4
	4-21	18-35	1.20-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.24		
	21-24	15-35	1.20-1.50	0.6-2.0	0.08-0.12	3.6-5.5	Low	0.24		
	24-26	---	---	---	---	---	---	---		
Lowell----------	0-4	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	1-4
	4-55	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate	0.28		
	55-60	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-8.4	Moderate	0.28		
	60-62	---	---	---	---	---	---	---		
GsB, GsC----------	0-10	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low	0.37	5	1-3
Glenford	10-45	18-35	1.45-1.65	0.2-2.0	0.14-0.18	4.5-6.0	Moderate	0.43		
	45-57	18-35	1.45-1.65	0.2-0.6	0.13-0.17	5.6-7.3	Low	0.43		
	57-80	15-30	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low	0.37		

See footnote at end of table.

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
GtC	0-8	13-27	1.30-1.50	0.6-2.0	0.19-0.24	4.5-7.3	Low	0.43	3	1-3
Guernsey	8-15	22-38	1.35-1.55	0.2-2.0	0.15-0.21	4.5-6.0	Moderate	0.43		
	15-45	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High	0.32		
	45-64	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High	0.32		
	64-66	---	---	---	---	---	---	---		
GuD2, GuE2	0-9	27-35	1.35-1.55	0.2-0.6	0.17-0.22	4.5-7.3	Moderate	0.43	3	.5-2
Guernsey	9-40	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High	0.32		
	40-80	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High	0.32		
	80-83	---	---	---	---	---	---	---		
HeD	0-7	7-18	1.20-1.40	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.17	3	2-4
Hazleton	7-30	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low	0.15		
	30-42	5-15	1.20-1.40	2.0-20	0.06-0.12	3.6-5.5	Low	0.15		
	42-44	---	---	---	---	---	---	---		
HeE, HeF	0-3	7-18	1.20-1.40	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.17	3	2-4
Hazleton	3-34	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low	0.15		
	34-66	5-15	1.20-1.40	2.0-20	0.06-0.12	3.6-5.5	Low	0.15		
	66-68	---	---	---	---	---	---	---		
KeB	0-10	12-25	1.30-1.45	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.43	4	1-3
Keene	10-30	18-33	1.30-1.55	0.2-2.0	0.18-0.22	4.5-5.5	Moderate	0.37		
	30-50	30-45	1.40-1.60	0.06-0.6	0.10-0.15	4.5-6.0	Moderate	0.37		
	50-80	27-53	1.40-1.60	0.06-0.6	0.08-0.13	4.5-7.3	Moderate	0.37		
LnC	0-7	12-27	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	1-4
Lowell	7-44	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate	0.28		
	44-52	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-8.4	Moderate	0.28		
	52-54	---	---	---	---	---	---	---		
LoD2, LoE2	0-6	27-40	1.20-1.40	0.6-2.0	0.18-0.23	4.5-6.5	Low	0.37	3	.5-2
Lowell	6-48	35-60	1.30-1.60	0.2-2.0	0.13-0.19	4.5-6.5	Moderate	0.28		
	48-64	40-60	1.50-1.60	0.2-0.6	0.12-0.17	5.1-8.4	Moderate	0.28		
	64-66	---	---	---	---	---	---	---		
Me	0-6	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43	5	.5-3
Melvin	6-40	18-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43		
	40-80	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low	0.43		
MnB, MnD	0-12	27-40	1.40-1.65	0.2-0.6	0.13-0.18	6.1-8.4	Moderate	0.43	2	.5-2
Morristown	12-80	20-35	1.65-1.90	0.2-0.6	0.03-0.11	7.4-8.4	Moderate	0.32		
MoB, MoD, MoE	0-7	27-35	1.50-1.75	0.2-0.6	0.07-0.14	6.1-8.4	Moderate	0.32	5	<.5
Morristown	7-80	20-35	1.65-1.90	0.2-0.6	0.03-0.11	7.4-8.4	Moderate	0.32		
MrF	0-5	18-27	1.50-1.75	0.6-2.0	0.08-0.16	6.1-8.4	Low	0.32	5	<.5
Morristown	5-80	20-35	1.65-1.90	0.2-0.6	0.03-0.11	7.4-8.4	Moderate	0.32		
No, Np	0-11	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5	2-4
Nolin	11-40	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43		
	40-80	10-30	1.30-1.55	0.6-6.0	0.10-0.23	5.1-8.4	Low	0.43		
OmB, OmC	0-9	12-18	1.25-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.43	4	.5-2
Omulga	9-26	20-35	1.30-1.45	0.6-2.0	0.18-0.22	3.6-6.5	Moderate	0.43		
	26-40	18-30	1.60-1.80	0.06-0.2	0.06-0.08	3.6-5.5	Moderate	0.43		
	40-70	20-35	1.50-1.60	0.2-0.6	0.18-0.21	4.5-6.0	Moderate	0.43		
	70-80	22-45	1.50-1.60	0.2-0.6	0.10-0.18	4.5-7.3	Moderate	0.32		

See footnote at end of table.

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Or	0-10	12-27	1.25-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low	0.37	5	2-4
Orrville	10-31	18-30	1.30-1.50	0.6-2.0	0.15-0.19	5.1-6.5	Low	0.37		
	31-80	10-25	1.20-1.40	0.6-6.0	0.08-0.15	5.1-7.3	Low	0.37		
OsB	0-10	8-15	1.30-1.60	2.0-6.0	0.10-0.13	5.1-6.5	Low	0.15	5	.5-3
Oshtemo	10-40	10-18	1.20-1.60	2.0-6.0	0.12-0.19	5.1-6.5	Low	0.24		
	40-80	5-15	1.20-1.60	2.0-6.0	0.08-0.10	5.1-7.3	Low	0.17		
Pe	0-10	15-26	1.30-1.45	0.6-2.0	0.20-0.24	4.5-7.3	Low	0.43	5	1-2
Peoga	10-60	22-34	1.40-1.60	0.06-0.2	0.18-0.20	4.5-5.5	Moderate	0.43		
	60-80	20-34	1.40-1.60	0.06-0.2	0.19-0.21	4.5-6.5	Low	0.43		
RcB, RcC	0-12	15-27	1.30-1.40	0.6-2.0	0.16-0.20	5.1-7.3	Low	0.37	5	1-3
Richland	12-52	18-35	1.40-1.60	0.6-2.0	0.10-0.16	5.1-7.3	Moderate	0.28		
	52-80	18-35	1.40-1.60	0.6-2.0	0.07-0.11	5.6-7.3	Moderate	0.28		
RgD, RgE	0-4	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low	0.24	4	.5-3
Rigley	4-44	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low	0.17		
	44-75	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low	0.17		
	75-80	---	---	---	---	---	---	---		
Tg	0-10	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low	0.37	5	2-6
Tioga	10-36	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low	0.28		
	36-80	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low	0.28		
Uc*:										
Udorthents.										
Pits.										
UpC2	0-7	27-35	1.20-1.50	0.2-0.6	0.12-0.16	4.5-6.5	Moderate	0.37	3	.5-3
Upshur	7-42	40-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-7.8	High	0.32		
	42-64	27-45	1.30-1.60	0.06-0.2	0.08-0.12	5.1-8.4	Moderate	0.32		
	64-66	---	---	---	---	---	---	---		
UpD2	0-4	27-35	1.20-1.50	0.2-0.6	0.12-0.16	4.5-6.5	Moderate	0.37	3	.5-3
Upshur	4-44	40-55	1.30-1.60	0.06-0.2	0.10-0.14	4.5-7.8	High	0.32		
	44-54	27-45	1.30-1.60	0.06-0.2	0.08-0.12	5.1-8.4	Moderate	0.32		
	54-58	---	---	---	---	---	---	---		
WhC, WhD, WhE	0-4	15-30	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	3	1-4
Westmoreland	4-40	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28		
	40-50	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low	0.17		
	50-52	---	---	---	---	---	---	---		
WmE*:										
Westmoreland	0-7	15-30	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	3	1-4
	7-40	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28		
	40-50	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low	0.17		
	50-52	---	---	---	---	---	---	---		
Coshocton	0-5	15-23	1.30-1.50	0.6-2.0	0.18-0.23	3.6-7.3	Low	0.37	5	1-3
	5-24	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-5.5	Moderate	0.37		
	24-42	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate	0.37		
	42-50	24-45	1.45-1.70	0.06-0.6	0.08-0.12	4.5-6.0	Moderate	0.28		
	50-54	---	---	---	---	---	---	---		

See footnote at end of table.

Table 18.--Physical and Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
WnE*, WnF*:										
Westmoreland	0-4	15-30	1.20-1.40	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37	3	1-4
	4-32	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.28		
	32-48	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low	0.17		
	48-50	---	---	---	---	---	---	---		
Dekalb	0-4	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low	0.17	2	2-4
	4-32	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low	0.17		
	32-37	5-15	1.20-1.50	>6.0	0.05-0.10	3.6-5.5	Low	0.17		
	37-40	---	---	---	---	---	---	---		
WoF*:										
Westmoreland	0-3	15-30	1.20-1.50	0.6-2.0	0.14-0.20	4.5-6.5	Low	0.28	3	1-4
	3-32	20-35	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.5	Low	0.28		
	32-42	18-35	1.20-1.50	0.6-2.0	0.06-0.10	5.1-6.0	Low	0.17		
	42-44	---	---	---	---	---	---	---		
Dekalb	0-3	10-20	1.20-1.50	6.0-20	0.08-0.12	3.6-6.5	Low	0.17	2	2-4
	3-31	7-18	1.20-1.50	6.0-20	0.06-0.12	3.6-5.5	Low	0.17		
	31-33	---	---	---	---	---	---	---		

* See description of the map unit for composition and behavior charactistics of the map unit.

Table 19.--Soil and Water Features

(“Flooding” and “water table” and terms such as “rare,” “brief,” “apparent,” and “perched” are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AaB, AbC2--------- Aaron	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	40-60	Soft	High-----	High-----	Moderate.
BkC, BkD---------- Berks	C	None---------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
BkE, BkF---------- Berks	C	None*-------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
BmC**:												
Berks------------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
Aaron------------	C	None---------	---	---	1.5-3.0	Perched	Nov-Mar	40-60	Soft	High-----	High-----	Moderate.
BnD**:												
Berks------------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
Guernsey---------	C	None---------	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High-----	High-----	Moderate.
BnE**:												
Berks------------	C	None*-------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
Guernsey---------	C	None*-------	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High-----	High-----	Moderate.
BpB, BpD, BpF----- Bethesda	C	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
BsD--------------- Brookside	C	None---------	---	---	2.5-4.0	Perched	Mar-Jun	>60	---	Moderate	Moderate	Moderate.
Ca---------------- Canadice	D	None---------	---	---	0-1.0	Apparent	Dec-Jun	>60	---	Moderate	High-----	Low.
CcA--------------- Caneadea	D	None*-------	---	---	1.0-2.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
CnB--------------- Coshocton	C	None---------	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High-----	High-----	High.

See footnotes at end of table.

Table 19.--Soil and Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
CnC, CnD---------- Coshocton	C	None*-------	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High-----	High-----	High.
DkC---------- Dekalb	C	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
Dm**. Dumps												
FaB, FaD, FaE----- Fairpoint	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
FcA, FcB---------- Fitchville	C	None*-------	---	---	1.0-2.5	Perched	Nov-May	>60	---	High-----	High-----	Moderate.
GeC, GeD---------- Germano	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
GnB---------- Gilpin	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
GnC, GnD---------- Gilpin	C	None*-------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
GoC**, GoD**:												
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
Coshocton--------	C	None--------	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High-----	High-----	High.
GpC**, GpD**:												
Gilpin----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low------	High.
Lowell----------	C	None--------	---	---	>6.0	---	---	>40	Hard	---	High-----	Moderate.
GsB, GsC---------- Glenford	C	None*-------	---	---	2.0-3.5	Perched	Nov-May	>60	---	High-----	Moderate	Moderate.
GtC---------- Guernsey	C	None*-------	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High-----	High-----	Moderate.
GuD2---------- Guernsey	C	None--------	---	---	1.5-3.0	Perched	Jan-Apr	>50	Soft	High-----	High-----	Moderate.

See footnotes at end of table.

Table 19.--Soil and Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
GuE2--Guernsey	C	None*	---	---	1.5-3.0	Perched	---	>50	Soft	High	High	Moderate.
HeD, HeE, HeF--Hazleton	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
KeB--Keene	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
LnC, LoD2, LoE2--Lowell	C	None	---	---	>6.0	---	---	>40	Hard	Moderate	High	Moderate
Me--Melvin	D	Frequent*	Very long	Sep-Jun	+2-0.5	Apparent	Jan-Dec	>60	---	High	High	Low.
MnB, MnD, MoB, MoD, MoE, MrF--Morristown	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
No--Nolin	B	Occasional*	Brief to long.	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	High	Low	Moderate.
Np--Nolin	B	Frequent	Brief to long.	Feb-May	3.0-6.0	Apparent	Feb-Mar	>60	---	High	Low	Moderate.
OmB, OmC--Omulga	C	None	---	---	2.0-3.5	Perched	Jan-Apr	>60	---	High	Moderate	High.
Or--Orrville	C	Occasional*	Very brief to brief.	Nov-May	1.0-2.5	Apparent	Nov-Jun	>60	---	High	High	Moderate.
OsB--Oshtemo	B	None*	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
Pe--Peoga	C	Rare	---	---	0-1.0	Apparent	Jan-May	>60	---	High	High	High.
RcB, RcC--Richland	B	None*	---	---	3.0-6.0	Apparent	Nov-May	>60	---	Moderate	Moderate	Moderate.
RgD, RgE--Rigley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.

See footnotes at end of table.

Table 19.--Soil and Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Tg---------- Tioga	B	Occasional	Brief-----	Nov-May	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low------	Moderate.
Uc** Udorthents.												
Pits.												
UpC2, UpD2-------- Upshur	D	None--------	---	---	>6.0	---	---	>40	Soft	Moderate	High-----	Moderate.
WhC, WhD, WhE----- Westmoreland	B	None--------	---	---	>6.0	---	---	>40	Hard	Moderate	Low------	High.
WmE**:												
Westmoreland----- Coshocton--------	B C	None*-------	--- ---	--- ---	>6.0 1.5-3.0	--- Perched	--- Jan-Apr	>40 40-84	Hard Soft	Moderate High-----	Low------ High-----	High. High.
WnE**, WnF**, WoF**:												
Westmoreland---- Dekalb----------	B C	None*-------	--- ---	--- ---	>6.0 >6.0	--- ---	--- ---	>40 20-40	Hard Hard	Moderate Low------	Low------ Low------	High. High.

* Included in mapping are small areas of soils that are not normally flooded but are within the flood pool of lakes in the conservancy district. These areas are subject to controlled flooding and are shown on the soil maps.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 20.--Classification of the Soils

Soil name	Family or higher taxonomic class
Aaron	Fine, mixed, mesic Aquic Hapludalfs
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Bethesda	Loamy-skeletal, mixed, acid, mesic Typic Udorthents
Brookside	Fine, mixed, mesic Typic Hapludalfs
Canadice	Fine, illitic, mesic Typic Ochraqualfs
Caneadea	Fine, illitic, mesic Aeric Ochraqualfs
Coshocton	Fine-loamy, mixed, mesic Aquultic Hapludalfs
Dekalb	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Fairpoint	Loamy-skeletal, mixed, nonacid, mesic Typic Udorthents
Fitchville	Fine-silty, mixed, mesic Aeric Ochraqualfs
Germano	Coarse-loamy, mixed, mesic Typic Hapludults
Gilpin	Fine-loamy, mixed, mesic Typic Hapludults
Glenford	Fine-silty, mixed, mesic Aquic Hapludalfs
Guernsey	Fine, mixed, mesic Aquic Hapludalfs
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Keene	Fine-silty, mixed, mesic Aquic Hapludalfs
Lowell	Fine, mixed, mesic Typic Hapludalfs
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Morristown	Loamy-skeletal, mixed (calcareous), mesic Typic Udorthents
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Omulga	Fine-silty, mixed, mesic Typic Fragiudalfs
Orrville	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Oshtemo	Coarse-loamy, mixed, mesic Typic Hapludalfs
Peoga	Fine-silty, mixed, mesic Typic Ochraqualfs
Richland	Fine-loamy, mixed, mesic Typic Hapludalfs
Rigley	Coarse-loamy, mixed, mesic Typic Hapludults
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Upshur	Fine, mixed, mesic Typic Hapludalfs
Westmoreland	Fine-loamy, mixed, mesic Ultic Hapludalfs

Interpretive Groups

Interpretive Groups

(Dashes indicate that the soil was not assigned to the interpretive group)

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol	Pasture and hayland suitability group
AaB—Aaron	IIe	Yes	4C	A-6
AbC2—Aaron	IIIe	No	4C	A-6
BkC—Berks	IIIe	No	4F	F-1
BkD—Berks	IVe	No	4R (north aspect) 3R (south aspect)	F-1
BkE—Berks	VIe	No	4R (north aspect) 3R (south aspect)	F-2
BkF—Berks	VIIe	No	4R (north aspect) 3R (south aspect)	H-1
BmC— Berks	IIIe	No	 4F	 F-1
Aaron			4C	A-6
BnD— Berks	IVe	No	 4R (north aspect) 3R (south aspect)	 F-1 F-1
Guernsey			4R	A-2
BnE— Berks	VIe	No	 4R (north aspect) 3R (south aspect)	 F-2 F-2
Guernsey			4R	A-3
BpB—Bethesda	VIs	No	4F	E-3
BpD—Bethesda	VIs	No	4R	E-3
BpF—Bethesda	VIIe	No	4R	H-1
BsD—Brookside	IVe	No	5R (north aspect) 4R (south aspect)	A-2
Ca—Canadice	IVw	No	2W	C-2
CcA—Caneadea	IIIw	No	4C	C-2
CnB—Coshocton	IIe	Yes	4A	A-6
CnC—Coshocton	IIIe	No	4A	A-6
CnD—Coshocton	IVe	No	4R (north aspect) 3R (south aspect)	A-2

See footnotes at end of table.

Interpretive Groups--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol	Pasture and hayland suitability group
DkC—Dekalb	IIIe	No	4F	F-1
Dm—Dumps	---	No	---	---
FaB—Fairpoint	IIIs	No	---	B-4
FaD—Fairpoint	IVs	No	---	B-4
FaE—Fairpoint	VIe	No	---	E-2
FcA—Fitchville	IIw	Yes**	5A	C-1
FcB—Fitchville	IIe	Yes**	5A	C-1
GeC—Germano	IIIe	No	4D	F-1
GeD—Germano	IVe	No	4R (north aspect) 3R (south aspect)	F-1
GnB—Gilpin	IIe	Yes	4A	F-1
GnC—Gilpin	IIIe	No	4A	F-1
GnD—Gilpin	IVe	No	4R	F-1
GoC—	IIIe	No	4A	
Gilpin				F-1
Coshocton				A-6
GoD—	IVe	No		
Gilpin			4R	F-1
Coshocton			4R (north aspect) 3R (south aspect)	A-2 A-2
GpC—	IIIe	No		
Gilpin			4A	F-1
Lowell			5A	A-1
GpD—	IVe	No		
Gilpin			4R	F-1
Lowell			5R	A-2
GsB—Glenford	IIe	Yes	5A	A-6
GsC—Glenford	IIIe	No	5A	A-6
GtC—Guernsey	IIIe	No	4A	A-6

See footnotes at end of table.

Interpretive Groups--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol	Pasture and hayland suitability group
GuD2—Guernsey	IVe	No	4R	A-2
GuE2—Guernsey	VIe	No	4R	A-3
HeD—Hazleton	IVe	No	4R (north aspect) 3R (south aspect)	B-1
HeE—Hazleton	VIe	No	4R (north aspect) 3R (south aspect)	B-2
HeF—Hazleton	VIIe	No	4R (north aspect) 3R (south aspect)	H-1
KeB—Keene	IIe	Yes	4A	A-6
LnC—Lowell	IIIe	No	5A	A-1
LoD2—Lowell	IVe	No	5R	A-2
LoE2—Lowell	VIe	No	5R	A-3
Me—Melvin	Vw	No	5W	C-3
MnB—Morristown	IIIs	No	---	B-4
MnD—Morristown	IVs	No	---	B-4
MoB—Morristown	VIs	No	4X	E-1
MoD—Morristown	VIs	No	4R	E-1
MoE—Morristown	VIIe	No	4R	E-2
MrF—Morristown	VIIe	No	4R	H-1
No—Nolin	IIw	Yes	5A	A-5
Np—Nolin	IIw	Yes***	5A	A-5
OmB—Omulga	IIe	Yes	4D	F-3
OmC—Omulga	IIIe	No	4D	F-3

See footnotes at end of table.

Interpretive Groups--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol	Pasture and hayland suitability group
Or Orrville	IIw	Yes**	5A	C-3
OsB Oshtemo	IIIs	Yes	4A	A-1
Pe Peoga	IIIw	Yes**	5W	C-2
RcB Richland	IIe	Yes	5A	A-1
RcC Richland	IIIe	No	5A	A-1
RgD Rigley	IVe	No	4R (north aspect) 3R (south aspect)	A-2
RgE Rigley	VIIe	No	4R (north aspect) 3R (south aspect)	A-3
Tg Tioga	IIw	Yes	4A	A-5
Uc Udorthents-Pits	---	No	---	---
UpC2 Upshur	IVe	No	3C	A-1
UpD2 Upshur	VIe	No	4R (north aspect) 3R (south aspect)	A-2
WhC Westmoreland	IIIe	No	4A	A-1
WhD Westmoreland	IVe	No	4R	A-2
WhE Westmoreland	VIe	No	4R	A-3
WmE Westmoreland Coshocton	VIe	No	4R 4R (north aspect) 3R (south aspect)	A-3
WnE Westmoreland Dekalb	VIe	No	4R 4R (north aspect) 3R (south aspect)	A-3 F-2 F-2
WnF Westmoreland Dekalb	VIIe	No	4R 4R (north aspect) 3R (south aspect)	H-1

See footnotes at end of table.

Interpretive Groups--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol	Pasture and hayland suitability group
WoF—Westmoreland-Dekalb	VIIs	No	4R 4R (north aspect) 3R (south aspect)	H-1

* A complex is treated as a single management unit in the land capability and prime farmland columns.
** Where drained.
*** Where protected from flooding or not frequently flooded during the growing season.